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The Value of a Loss: The Impact of Restricting Tax Loss Transfers

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The value of a loss: The impact of restricting tax loss transfers*

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Abstract

We study the economic consequences of anti-loss trafficking rules, which disallow the use of loss carry-forwards as tax shield after a substantial ownership change. We use staggered changes to these rules in the EU27 Member States, Norway, and the United Kingdom from 1998 to 2019 and find that limiting the transfer of tax losses reduces the number of M&A by 18%. The impairment is driven by loss-making targets. Turning to the broader impact on industry dynamics, we find decreases in survival rates of young companies in response to tighter regulations. Some of these start-up deaths are compensated by new firm entrants. Loosening of regulation spurs firm entry and survival. Finally, tightening (loosening) anti-loss trafficking rules impairs (increases) industry productivity, especially for R&D-intensive industries that are more prone to loss-making in their life cycle. This is driven by anti-loss trafficking rules muting deal synergies and risk-taking.

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1 Introduction

A well-functioning M&A market is a key driver of economic growth (David [2021]). M&A activity can enhance firm productivity, both through synergies that increase the combined equity value of the target and acquiring firms (e.g. Bradley et al. [1988]; Morck et al. [1990]; Devos et al. [2009]; Li [2013]) but also indirectly by affecting entry and exit in anticipation of future M&A (e.g. Dimopoulos and Sacchetto [2017]). One important but underexplored aspect in this literature is the value of tax loss carryforwards (LCFs) in M&A transactions. Most major economies (including the United States and many European countries) have restricted the transfer of tax losses in corporate takeovers with anti-loss trafficking rules. These restrictions can reduce the attractiveness of potential targets and pose a barrier to efficient capital reallocation. They may be especially harmful when it comes to transactions involving R&D-intensive targets and firms early in their life cycle, which are more prone to loss-making. However, there is little systematic evidence on how such rules affect M&A activity or whether they generate broader economic consequences. We contribute to the literature by exploring the broader economic effects of restricting loss transfers on M&A activity, firm entry and exits, as well as industry-performance in R&D-intensive risk-taking industries.

Typically, countries treat losses asymmetrically for tax purposes. They tax profits, but they do not immediately give tax refunds for losses; the losses must be carried over to the past (loss carryback (LCB)) or future (LCF). Anti-loss trafficking rules determine the extent to which targets' intertemporal losses can be used to reduce taxable income after takeovers. If taxable losses can be transferred without limitation, profitable buyers can acquire loss-making targets and use the losses as tax shields (Auerbach and Reishus [1988]). Anti-loss trafficking rules aim to protect government revenues and prevent tax-driven transactions by restricting the use of acquired losses when there are substantial changes in ownership or activity. Whether these rules are desirable for economic value creation is unclear. Theoretically, they can hinder or foster the realization of pre-tax synergies in M&A, depending on whether the value of tax losses outweighs the potential non-tax synergy gains (Erickson et al. [2019]).

If a government restricts the transfer of accumulated losses when ownership changes, the tax asset does not carry value for the acquirer. This reduces the price the acquirer is willing to pay for the target but not the reservation price of the seller, which can affect the acquisition decision. Anecdotal evidence indicates that enforcing or loosening anti-loss trafficking rules substantially affects M&A values.[1] In fact, companies actively use net operating loss poison pills to reduce the likelihood of being taken over, as the ownership change would trigger anti-loss trafficking rules (Sikes et al. [2014]). The implications are twofold: First, we hypothesize that anti-loss trafficking rules can affect the probability of a deal occurring as offer and reservation prices diverge. Second, shifts in deal likelihood will

[1] In Appendix C, we provide examples collected from the news and court cases that show how the ability to utilize the target's tax assets can shape the probability of a deal and the final value.

have broader economic consequences for industry dynamics, including firm entry, exit, and productivity.

The lack of comprehensive institutional data, in conjunction with a lack of proper "within country" counterfactuals, has inhibited empirical analyses of anti-loss trafficking rules. To address this issue, we hand-collect detailed information from tax guides and national tax codes[2] of EU27 Member States, Norway and United Kingdom to generate a comprehensive dataset of anti-loss trafficking rules in place from 1998 to 2019. We identify 17 changes in legislation during this period: the rules were tightened eight times and relaxed nine times. This allows us to select treatments for our analysis that do not coincide with other economic events (such as the 2008 Financial Crisis) and that occur in countries with sufficient coverage of M&A in our sample.[3]

We adopt a stacked cohort difference-in-differences research design, relying on the timing differences in these reforms to evaluate the economic consequences of restricting the transfer of losses across countries. This provides us with control groups, which we would lack in a within-country approach, enabling us to identify the treatment effect of this type of regulation. Due to the staggered implementation of these legislative changes and a comprehensive set of control variables, our empirical identification resembles a quasi-experiment, similar to the one of Baugh et al. [2018] or Fuest et al. [2018]. In additional tests, we exploit within-country variation in the LCF status and industry affiliation in a triple difference-in-differences design, which allows us to additionally control for country-year specific shocks.

We begin our study by investigating the effect of anti-loss trafficking rules on the market for corporate control, examining M&A numbers. For this purpose, we combine our hand-collected institutional information with micro-level data from Zephyr, covering over 145,000 M&A in the EU27 Member States, Norway and United Kingdom. Using a difference-in-differences strategy, we find that anti-loss trafficking rules reduce the number of deals at the country level by about 18% on average. These effects are driven by loss-making targets with a drop of 28%. We do not find an effect when running a placebo test on M&A with profitable targets, which suggests the observed treatment effect on M&A with loss-making targets is indeed due to changes in anti-loss trafficking regulations. We formally test this relationship in a triple difference-in-differences design. Starting from changes in M&A activity before and after legislative changes (first difference) between treated and control countries (second difference), we additionally compare the effect on loss-making targets versus targets without losses prior to the deal within a country (third difference). This allows us to control for country-year fixed effects. The results of this more extensive specification confirm our initial findings, suggesting a highly significant average decrease in M&A of 21% for loss-making targets versus non-loss-making targets within treated countries. Given the strong cyclicality of M&A markets, our effect estimate is substantial yet within a plausible range, especially relative to prior studies of accounting and tax policy changes (e.g., Blouin et al. [2021], Bonetti et al. [2020]). In a back-of-the-envelope calculation, we estimate a loss in deal values

[2]See Bührle and Spengel [2020] for details of the regulatory framework.

[3]In robustness tests, we rule out that other major tax reforms that can affect M&A drive our results.

of EUR 80 billion per year in Europe at the end of our sample period.

To corroborate our findings, we run two firm-level analyses exploiting specific country cases where we access the LCFs as reported in tax returns. Running these analyses at the firm level enables us to also control for important firm-level characteristics.[4] First, we link our M&A sample to Compustat data for U.S. acquirers, which report tax LCFs explicitly. Our findings imply an average loss in tax benefits caused by anti-tax loss trafficking rules equal to USD 91 million. Second, we draw on administrative tax and financial data from Norway to examine the role of target LCFs around the tightening of Norway's anti-loss trafficking rule. We run a linear survival probability model and find that, on average, the probability of being acquired is reduced by 30% post-reform for targets with LCF.

We next study the broader economic consequences of anti-loss trafficking rules, that is, consequences on firm exit and entry, and industry-level performance. In our initial tests, we showed that loss firms are significantly less likely to be M&A targets in the presence of strict anti-loss trafficking regulations. Whether this change improves or hurts capital allocation is unclear, as anti-loss trafficking rules may affect both persistently underperforming money-losing firms and firms for which losses are a necessary but temporary part of their life cycle, such as startups or R&D-intensive firms.

We establish two mechanisms through which anti-loss trafficking rules may hurt industry dynamics. First, by deterring value-creating ownership changes, these rules can prevent acquisitions that would otherwise support firm growth. As the probability of firm acquisitions declines, this can have broader implications for entry, exit, and capital allocation, especially for young or financially constrained firms, such as start-ups, that rely on equity financing to scale. Second, restricting the use of tax losses raises the effective cost of downside risk and decreases firm value, making high-risk, high-reward ventures less attractive. These changes in risk-taking incentives may limit firm growth, reduce market entry, and lower industry-level profitability (Langenmayr and Lester [2018], Phillips and Zhdanov [2013]). These effects on profitability may be especially pronounced in R&D-intensive sectors, where acquisitions play a central role in driving innovation and productivity gains (Bena and Li [2014], Phillips and Zhdanov [2013]).

To study the impact of anti-loss trafficking rules on young firm exit and entry rates, we rely on industry-country-level data from Eurostat and employ an industry-level stacked cohort difference-in-differences analysis with industry-country and industry-year fixed effects. Hence, differences in exit and entry rates due to industry time trends and time-invariant industry-country characteristics are eliminated. The specification allows a within-industry comparison of the effect of a change in anti-loss trafficking rules between industries in treated countries and counterfactual industries from the same industry year in non-treated countries.

In line with the hypothesis that a decreased interest of potential acquirers will likely

[4]In the Appendix, we also display the results of running the analysis at firm-level using a linear survival probability model. Results confirm the negative effect of anti-loss trafficking rules on the target's acquisition probability. Yet, we face the same limitation as for our country-level analysis, i.e. the analysis relies on accounting data to proxy for tax LCFs.

reduce the chances of survival, we find a significant average reduction in mean survival rate of young firms by 4 percentage points. This effect is driven both by decreases and increases in survival rates after tightening and loosening of legislation, respectively. We observe a significant increase in firm entry for both tightening and loosening of 3 and 1 percentage points, respectively. Looser legislation lowers the effective tax burden on risky projects, encouraging entry, while tightening regulations raises downside risk. However, stricter regulations may additionally accelerate the exit of underperforming firms, freeing up space for new, more productive entrants. This effect may not be mirrored under loosening, since re-entry of low-productivity firms is typically slower.

Last, we study industry-wide performance effects by aggregating firm-level measures for the whole population of EU firms (i.e., public and private) from Orbis for the years 1998-2019 at the industry level. As we do above, we employ an industry-level difference-in-differences analysis. To capture industry performance, we use the mean return on assets of that industry weighted by firm sales. We find a 8% performance decrease in response to anti-loss trafficking rules. In line with our expectation, this effect is more pronounced in risk-prone R&D-intensive industries. We confirm this finding in a triple difference-in-differences design, including country-year fixed effects.

We shed more light on the underlying mechanism of these industry-performance findings by testing for changes in deal synergies and risk-taking. First, we estimate changes in deal synergies for targets and acquirers, finding that loosening anti-loss trafficking rules leads to significant productivity gains, especially for targets. Specifically, target synergies in terms of ROA increase by 1.7 percentage points post-deal, while acquirers benefit from a 0.9 percentage point increase. These results support the hypothesis that less restrictive anti-loss trafficking rules enhance deal synergies for both targets and acquirers. Second, we test the effect of anti-loss trafficking regulations on industry-level risk-taking, which declines by approximately 0.4 percentage points following anti-loss trafficking tightening and increases by 1.1 percentage points following loosening. Further analysis of future acquisition targets indicates that firms expecting to be acquired reduce risk-taking by 1 percentage points in response to anti-loss trafficking rules. Thus, the overall evidence aligns with the hypothesis that tighter anti-loss trafficking regulations discourage risk-taking, potentially hindering productivity growth.

We run several robustness checks to validate our assumptions. We carefully check that no other local events[5] may cause both changes in anti-loss trafficking rules and changes in firm behavior, establishing a spurious correlation between taxes and firm performance or M&A. We show that local economic shocks, measured by GDP trends and trade trends pre-reform, do not evoke the introduction or changes of anti-loss trafficking rules. Nevertheless, to ensure that economic conditions between control countries are comparable to treated countries in our sample, we rerun all our main estimations in a sample that is entropy-balanced on the level of pre-treatment GDP and trade between treated and control countries. We also ensure

[5]We discuss possible confounding events in Appendix D and control for these in all our regressions. This includes controlling for changes in tax LCF and LCB legislation and corporate tax rate changes.

that our findings are robust to dropping a country or cohort at a time, ruling out that results are driven by specific countries or cohorts. These results are reported in the Appendix and are very similar to our baseline results. In addition, the dynamic event study figures support that treatment and control groups follow parallel trends before the treatment.

This paper contributes to the literature on the determinants of M&A and M&A effects on corporate decisions. Studies by, for example, Cao et al. [2019], Dessaint et al. [2017], Erel et al. [2012], John et al. [2015], Rossi and Volpin [2004] show that economic and institutional factors, such as international trade integration, financial reporting quality, political uncertainty, and regulations on shareholder and employment protection, can shape the market for corporate control. We illuminate the impact of tax-related incentives on takeovers and how they shape market structure and corporate investments. Research has indicated that taxes affect acquisition decisions (e.g., Arulampalam et al. [2019], Blouin et al. [2021], Di Giovanni [2005], Huizinga and Voget [2009], Meier and Smith [2020]) and deal values (e.g., Ayers et al. [2003], Blouin et al. [2021], Hayn [1989], Huizinga et al. [2012, 2018], Kaplan [1989]). When considering the effect of limiting the transfer of losses for tax purposes, empirical evidence so far suggests that it affects the market value of listed corporations (Moore and Pruitt [1987]) and might affect the market for corporate control (Hoehl [2021]). We offer the first evidence documenting broad and substantial economic consequences of restricting and loosening anti-loss trafficking rules. In particular, we provide novel empirical evidence of the analytical results of Dimopoulos and Sacchetto [2017] by showing that shocks to M&A activity have wider repercussions on firms' risk-taking, entry, and exit rates as firms adjust their expectation of being a valuable target in future M&A transactions. Takeovers not only directly affect aggregated economic outcomes generated by potential deal synergies but also indirectly affect firms' expectations of becoming future M&A targets, thereby influencing broader economic outcomes.

We also add to the literature on behavioral responses to tax policy. The literature shows that taxes influence investment decisions (e.g., Djankov et al. [2010], Giroud and Rauh [2019], Heider and Ljungqvist [2015]). The results of our study illuminate possible unintended consequences of restricting the transfer of losses for tax purposes. Several studies show that managers take real actions to preserve the value of tax losses (e.g., Erickson and Heitzman [2010], Erickson et al. [2013], Maydew [1997], Sikes et al. [2014]). Research shows that more generous tax loss rules stimulate risky investment (Armstrong et al. [2019], Bührle [2021], Langenmayr and Lester [2018], Ljungqvist et al. [2017]). Bethmann et al. [2018] and Olbert [2025] demonstrate that they might also encourage poorly performing businesses to over-invest. Our paper complements these studies by documenting that limiting the benefits from tax losses in M&A can shape the probability of being acquired, firm entry and exit, risk taking, deal synergies, and reduce overall industry performance, especially in more risk-prone R&D-intensive industries.

Finally, our results have important policy implications. For example, the COVID-19 crisis resulted in a massive negative economic shock and triggered unprecedentedly quick

government responses worldwide.[6] To support economic growth, it may be most effective to implement measures that target young and R&D-intensive companies. Our results suggest that relaxing the restrictions on the transfer of tax losses in case of substantial changes in ownership could be considered after crisis. We test the economic consequences of such a policy on the market for corporate control and industry-wide performance. We find that looser regulations stimulate M&A and lead to more enterprise births, increased entrant survival, and improved performance in R&D-intensive industries. These outcomes highlight the potential benefits of policy adjustments aimed at fostering innovation and economic dynamism. However, policymakers face a complex trade-off. While facilitating the transfer of tax losses can promote innovation and support emerging firms, it may also result in significant revenue losses for tax authorities. Our final analysis provides tentative descriptive statistics assessing the tax revenue gain from restricting the transfer of losses in M&A.

The remainder of this paper is organized as follows. Section 2 provides the institutional background. Section 3 develops the hypotheses. Section 4 presents the research design, including the empirical strategy, the data, and sample selection. Section 5 describes the main results and robustness checks. We present descriptive evidence on tax revenue changes in section 6. Section 7 concludes.

2 Institutional background

If losses cannot be used to reduce profits incurred from other activities in the same period, they must be carried back to the past (LCBs) or over to the future (LCFs). Changes in ownership or activity can activate anti-loss trafficking rules, resulting in the forfeiture of accumulated LCFs. In other words, the LCF stock at the time of acquisition vanishes entirely and thus looses its value when the restriction is triggered.[7] Without these rules, unprofitable corporations with high LCFs can be bought and merged with profitable companies to benefit from the tax loss shield. Anti-loss trafficking rules assume abuse based on codified criteria.

Most European countries have implemented anti-loss trafficking rules. We observe 17 introductions or changes in legislation over our sample period. Two main trends emerge: more countries introduced such rules over time, while the regulations became less restrictive, i.e., the bar for losses to be denied after a transaction was set higher. These reforms are not endogenous to economic conditions, which is important for identification in our analysis. Both the introduction and loosening of rules are typically driven by idiosyncratic factors,

[6] See OECD2010COVID19MeasureEvalation.

[7] If the loss offset for pre-acquisition LCFs were simply restricted to profits generated by the acquired company, the new owners could shift profitable activity into the acquired company to circumvent the regulations. In contrast to the US Sec. 382 limitation, which restricts but does not completely disallow the use of accumulated loss carry-forwards, the rules examined in our analysis typically result in the complete forfeiture of these losses if the criteria (i.e., substantial change in ownership and/or activity) are fulfilled. Sweden is the only exception. Since the anti-loss trafficking rule is in place unchanged since 1983, the introduction of the anti-loss trafficking regulations in this country is not included in our analysis.

involving very low media coverage and not linked to fiscal stimulus. Regulations are usually introduced or tightened out of the political desire to protect tax revenue, along with the general trend toward stronger anti-abuse legislation in different areas of taxation during the last decades. We also observe other exogenous reasons that require changes in legislation. For example, the German Federal Constitutional Court ruled parts of the regulations as unconstitutional, forcing the German legislature to adjust the law.[8] Importantly, we do not find any indication of anti-loss trafficking legislation being implemented or changed in response to local economic conditions in our sample. In particular, there is no pre-trend in GDP or international trade in the run-up to changes in these regulations.[9]

The tax loss transfer restrictions commonly require a substantial change in ownership or activity as triggers; the definition of these criteria depends on national legislation. For our analysis, we assess whether changes in legislation loosen or tighten regulations. We thus rank regulations according to the following dimensions (by increasing strictness). Cumulative regulations require a change in ownership and a connected change in activity. If there is either only a change in ownership or only a change in activity, this type of restriction is not triggered. Alternatively, rules can mandate the forfeiture of losses after a change in activity, independent of any changes at the ownership level. A third type of anti-abuse regulation relies solely on a change in ownership. Fourth, countries can relate their loss transfer restrictions to either a change in ownership or a change in activity; the fulfillment of either criterion is sufficient. We consider regulations that depend solely on a change in ownership or activity to be more restrictive than those triggered only when both occur simultaneously. Table 1 provides an overview of the different categories ranked by strictness. Newly introduced (abolished) anti-loss trafficking regimes always constitute a tightening (loosening) in legislation. If the legislator adjusts an ownership-based regime by adding a cumulative activity criterion, we define the change as a loosening. In contrast, if the activity criterion is omitted and the rule relies on changes in ownership only, legislation has been tightened. Some countries allow certain exemptions. These so-called escape clauses vary by country and include reorganizations within groups, quoted companies, availability of hidden reserves, and providing compelling economic reasons to tax authorities. The burden of proof of non-abuse rests upon the taxpayer.[10] We further note that none of the national anti-loss trafficking rules considered in our analysis restricts the consideration of ownership changes to domestic owners only; both domestic and foreign acquisitions trigger the rules. Therefore, we do not distinguish between acquirer countries.

[8] Duttiné, T. (May 2017), German Federal Constitutional Court decides that German loss forfeiture rule is unconstitutional, see here GermanConstitutionalCourtDecision.

[9] See also Figure 6 and section 4.2.

[10] For more details, see Appendix B.

3 Hypothesis development

3.1 Tax loss transfer and M&A

The size, timing, and uncertainty of tax payments and deductions can create distortions in the expected profitability and valuation of a project, making taxes a key determinant of corporate decisions. Prior research has shown that tax deductions stimulate investment including M&A (Blouin et al. [2021], Lester [2019]). The transferability of losses from the target to the acquirer can determine the success of M&A, as tax losses constitute valuable assets (Hayn [1989]). If losses can lower the tax liability, they can increase the acquirer's willingness to pay (Auerbach and Reishus [1988]). However, if the ownership change causes accumulated losses to be non-deductible for tax purposes, this may reduce a potential acquirer's willingness to pay. The seller's reservation price does not change, as the loss remains with the target until the deal occurs. Only if the expected nontax synergies are sufficiently high for the acquirer will the deal still happen (Sikes et al. [2014]).

Absent anti-loss trafficking rules, purely tax-driven M&A may occur since, with no limitation on the transfer of losses, even deals with negative pre-tax synergies can be attractive for firms as long as the value of the losses to the acquirer is sufficiently high.[11] Thus, despite negative pre-tax synergies, the combined company can generate a larger after-tax income from the merger. However, anti-loss trafficking rules can also largely affect acquisitions that are not tax-driven by putting a wedge between buyers and targets reservation prices, inhibiting the realization of non-tax synergies.[12]

We expect that the number of deals in a country shrinks in response to the introduction or tightening of anti-loss trafficking rules as only those M&A still take place for which the expected non-tax synergies are sufficiently large to reach the seller's reservation price.

[11] This can be shown on a simple numerical example taken with slight adaption from Erickson et al. [2019], who generalize this example in a parsimonious model in their appendix: Assume a target with $100 in usable net operating losses (NOLs) and poor future economic outlook that expects to generate $60 in net present value terms. Let the tax rate be 50%. If the corporation stays independent, it will generate taxable income of $0. While after-tax profits will be $60, pre-tax income will be too small to use all its NOLs. Now assume a buyer without NOLs with future taxable income of $80 and consequently after-tax income of $40. The combined after-tax income pre-merger is therefore $100. In case of no limitations on NOL use, the acquisition would lead to an increase of combined pre-tax income of $140 and after-tax income to $120 ($80+$60-($80+$60-$100) *0.5), if there were no synergies generated from the merger. Even if we assume negative synergies, i.e., value destruction, of -$20, the combined after-tax income would be $110 ($120-($120-$100)*0.5).

[12] We can show this again in a simple numerical example that is taken with slight adaption from Erickson et al. [2019], who generalize this example in a parsimonious model in their appendix: Suppose a target has NOLs of $100 and can use after a merger only 30% ($30) of them. Further, assume that the merger will generate synergies of $20. The combined pre-tax income of the target and acquirer as standalone firms will be $140. It would increase to $160 due to the merger. Nevertheless, the merger is not beneficial, as the combined after-tax income of the target and acquirer pre-merger would be $100 ($60+$80-($80*0.5)), while after merger the NOLs would be lost and therefore combined after-tax income would fall to $95 ($160 - ($160-$30) * 0.5).

Whether deals that are prevented due to anti-loss trafficking legislation are purely tax-driven is theoretically unclear. We therefore broaden our analysis and investigate the consequences of inhibited M&A at the industry level.

3.2 Tax loss transfer, industry dynamics, and industry performance

Research shows that corporate tax policy shapes firm behavior and industry dynamics, influencing investment, entry, and exit decisions (Hanlon and Heitzman [2010], Jacob [2022]). Most relevant in our setting, prior literature finds that relaxing the asymmetric treatment of tax losses promotes risk-taking (Armstrong et al. [2019], Bührle [2021], Langenmayr and Lester [2018], Ljungqvist et al. [2017]), affects firm performance (Olbert [2025]), and fosters innovation (Guceri [2020]). Stricter loss limitations can even increase investment among loss-making firms that expect to return to profitability quickly (Hillmann and Jacob [2024]). The effectiveness of tax policy tools such as LCB and LCF extensions may depend on the institutional context, such as political and fiscal budget risk (Osswald and Sureth-Sloane [2020]).

Despite this growing literature, little is known about how limiting the transfer of losses in case of ownership change affects industry dynamics. As highlighted in section 3.1 above, tighter anti-loss trafficking rules can prevent purely tax-motivated deals. The remaining M&A deals may be more synergetic, improving capital allocation and productivity. Conversely, loosening of anti-loss trafficking rules might induce underperforming firms to overinvest and could foster their continued survival. However, anti-loss trafficking rules may not mainly prevent purely tax-motivated deals, but they can also inhibit economically beneficial deals, negatively affecting industry outcomes through two channels.

First, anti-loss trafficking rules can postpone or prevent value-creating ownership changes, especially for financially constrained firms, such as start-ups, that rely on equity financing to grow. Relaxing the financial constraints of developing firms and scaling these firms frequently requires substantial changes in the set of owners. As the probability of firm acquisitions declines, this can have broader implications for entry, exit, and capital allocation, especially for young or financially constrained firms (Dimopoulos and Sacchetto [2017]).[13] For example, Bena and Li [2014] shows that mergers in R&D-intensive firms generate synergies that lead to increased technological outputs. If deal synergies remain unrealized, overall economic output is depressed. We call this the ownership-synergy channel on industry performance.

Second, limiting the ability to offset losses upon acquisition could discourage risky investment in potential targets, especially for firms with uncertain, idiosyncratic returns. Restricting the use of LCFs raises the effective cost of downside risk and decreases firm value,

[13] As capital providers anticipate these frictions, some firms will not even be founded in the first place. Firm entry can be affected without founders knowing about the existence of anti-loss trafficking rules because it suffices for financially savvy capital providers to be aware of the effect of anti-loss trafficking rules on targets' market values.

making high-risk, high-reward ventures less attractive. Thus, anti-loss trafficking rules could lock firms into suboptimal growth paths, force early exit, or even prevent market entry. Vice versa, loosening such rules lowers the required rate of return for risky projects, thereby encouraging entry and potentially delaying exit. Overall, these tax-induced changes in risk-taking incentives could affect profitability at the industry level, consistent with findings in [Langenmayr and Lester, 2018]. This hypothesis also aligns with prior work showing that the option to be acquired encourages investment in risky, innovative ventures [Phillips and Zhdanov, 2013]. We refer to this as the risk-taking channel on industry performance.
Taken together, it remains an open empirical question whether anti-loss trafficking rules improve or impair industry dynamics and productivity. Potential disruptions may be particularly costly in R&D-intensive sectors, where start-up culture is a key driver of growth, with start-up acquisitions driving innovation (Phillips and Zhdanov [2013]) and mergers generating synergies that lead to increased technological outputs (Bena and Li [2014]), also pressuring incumbents to improve.

4 Empirical strategy

4.1 Data

Data on anti-loss trafficking rules: We hand-collected information on anti-loss trafficking rules across the EU27 Member States, Norway and United Kingdom using the IBFD tax research platform as well as the respective country's tax code for the years 1998-2019. In 2019, 20 of the member states had anti-loss trafficking rules, as visible in Figure 1, with substantial variation in design across countries (Bührle and Spengel [2020]). Overall we observe a total of 17 changes in legislation in 11 countries (see Table 2). Regulations were tightened eight times and relaxed nine times. The number of changes exploited in each regression can differ (see Table 18). we exclude any reform that occurred two years before or after the 2008 Financial Crisis (i.e., 2006-2010) as unobserved factors would dominate our outcome variables, such as M&A and industry performance, in an extremely heterogeneous manner.[14] Furthermore, the sample horizon in the industry-level regressions is constrained by data availability.[15]

Data on M&A: We collect data on M&A deals from Zephyr over the years 1998-2019 in the EU27 Member States, Norway and United Kingdom disregarding countries without M&A (less than one transaction per year on average). To account for the applicability of

[14]The exposure to the financial crisis varied substantially between countries (see, e.g., Salinari and Benassi [2022] Szczepanski [2019]). Specifically, the UNCTAD's dataset of worldwide cross-border M&A shows a large variation in average M&A activity pre and post financial crisis between the different countries (see descriptives from Reddy et al. [2014]). Equally, productivity-relevant economic indicators were differently affected, for instance, in Germany, unemployment only mildly reacted, yet in Spain, Portugal, and Ireland, unemployment rose sharply and immediately (see e.g., Arpaia and Curci [2010]).

[15]The data on entry and exit start in 2004.

anti-loss trafficking rules, we consider all transactions with unlisted targets, in which more than 50% of the firm changes ownership. We have a total of about 145,000 transactions across our sample period. For our analysis, we count M&A deals at the country-year level while differentiating between loss and non-loss targets.

In Panel (a) of Figure 2, we plot, for reforming countries, the development of M&A involving loss-making targets around the change in legislation in reforming countries. We normalize coefficients to the year before the change and only include country and year fixed effects to show the basic time trends in the data. The graph indicates a clear and significant decrease in M&A following changes in anti-loss trafficking rules. We take this as initial evidence in support of our hypothesis that the restrictions discourage M&A. In our main analysis, we formally test the hypothesis in a stacked saturated difference-in-differences specification in section 5.1.

Data on industry dynamics: We gather data on firm births and survival rates for the years 2004-2019 from Eurostat's Business Demography Database.[16] From this dataset, we obtain data on the birth and survival rate for the total population of firms in each EU country aggregated by industry-country-year (at the NACE two-digit level).

Data on industry performance: To study the effects of anti-loss trafficking regulation on overall industry performance, we construct an industry-country panel for the whole population of EU firms combining data from Orbis for the years 1998-2019, gathering information from Orbis discs 2008-2019. We begin our sample by selecting all firms located in the EU27 Member States, Norway and United Kingdom and obtain financial statement information at the unconsolidated level. We exclude companies from financial and extractive industries or with negative total assets, employees, sales, or tangible fixed assets. Finally, we calculate the sales-weighted average ROA at the industry-country-year level, where the industry is the two-digit NACE. We retain industry-level observations if this ROA average is based on at least 50 firms.

Panel (b) of Figure 2 depicts the time trend in industry performance (proxied by sales-weighted industry ROA) in reforming countries and differentiating between industries with high and low R&D intensity. We again normalize coefficients to the year before a change in anti-loss trafficking rules and only include country and year fixed effects as basic controls. The graph shows a clear decline in performance after changes in legislation for R&D-intensive industries. This suggests that strict anti-loss trafficking rules impair industry performance, especially in industries where high development costs and initial losses are to be expected. We do not find a similar pattern in low R&D industries. We provide stringent tests in a stacked saturated difference-in-differences analysis in section 5.3.

Data on control variables: The control variables are collected from various sources. Macro data on GDP, inflation, trade, and value-added are taken from the World Bank.[17] Population data comes from the United Nations.[18] Moreover, we obtain statutory corporate tax

[16]For more information on the data, see here EurostatDataBrowser.

[17]The World Bank data are available here WorldBankData.

[18]The United Nation data are available at UnitedNationsData

rates[19] and an indicator for EU membership from the European Commission[20]. Finally, we collect the audit and reporting quality indicators from the Global Competitiveness Report conducted by the World Economic Forum.[21]

All continuous variables are winsorized at the 1% and 99% levels. We present the summary statistics for all variables in Table 3 separated between treated and control group.[22] We also present further descriptive at target-level in Table 4. 65.0% of our targets with profit and loss information qualify as small firms, and 86% fall under the small and medium-sized category based on the EU classification.

4.2 Empirical specification

4.2.1 Identification strategy

The staggered changes in legislation allow us to control for common unobserved confounding factors at the country level that do not change over time, common EU-wide time trends, and observed time-variant country-specific factors. Based on the recent literature that points out potential confounding factors in staggered difference-in-differences designs, we investigate the effect of anti-loss trafficking rules in a stacked cohort difference-in-differences design following the approach of Cengiz et al. [2019] (see also Baker et al. [2022]). The estimation datasets throughout our analysis are calculated as follows. We construct a separate cohort dataset for each treatment event, where the treatment event is defined at the year level. In each cohort dataset, the treated group is composed of countries that change the anti-loss trafficking rule in the year corresponding to the treatment event, while the control group is composed of countries that change the anti-loss trafficking rule more than five years later or never during our sample period. We restrict observations in each cohort dataset to the five years pre and post changes in the treated countries. In this stacked design, we deal with repeatedly treated countries by dropping the second treatment if it is less than five years apart from the first. (This is relevant only for Greece, with a second treatment in 2018.) We run all regressions on the stacked cohort dataset.

4.2.2 Tax loss transfer and M&A

We start our analysis by investigating the overall effects on M&A at the country and target type level (loss or non-loss target); only loss targets should be affected by treatment, and non-loss targets in treated countries should remain unaffected. We use past accounting losses as the best proxy for tax LCFs. Conducting the main analysis at the country level allows us to capture the economy-wide effects of anti-loss trafficking rules on M&A activity, as

[19]The EU Commission data on corporate tax rates are available here EUCommissionCITData
[20]The EU commission data on EU membership are available here EUCommissionMembershipData
[21]The World Economic Forum data are available here WorldEconomicForumData
[22]In Appendix F.1, we present the descriptives for the full sample in Table 17.

aggregation allows us to estimate the overall effect of this regulation on a country's M&A market, similar to Breuer [2021].[23] In additional tests, we take the analysis to the firm level.

First, we adopt a stacked difference-in-differences identification strategy to obtain a comprehensive measure of the average effect.

$$Outcome_{ctl} = \alpha + \beta_1 * ChangeALT_{ct} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl}. \quad (1)$$

c stands for country, l for target type (loss or non-loss target), and t for year. For simplicity of exposition, we omit the cohort indicator since we always use a stacked specification. As the outcome, we define the logarithm of the number of M&A aggregated at the country-target type level by year.[24] In the spirit of Dessaint et al. [2017], we construct a treatment indicator that takes the value of 1 (-1) if a country tightens (loosens) anti-loss trafficking rules. Thus, the indicator variable of interest, $ChangeALT_{ct}$, increases (decreases) by 1 if a country tightens (loosens) anti-loss trafficking rules. The value does not change in the following years as long as the regulation remains. This definition assumes symmetry between the effects of tightening and loosening of the legislation. We relax this assumption by showing the effects separately for tightening and loosening. We construct two separate treatment indicators, one that takes the value of 1 if a regulation tightens and the other takes the value of 1 if a regulation loosens and zero otherwise ($TighteningALT, LooseningALT$).

Our country-level control variables include the lagged log of GDP, lagged GDP growth, the log of population, lagged inflation, a country's audit quality, a dummy for EU membership, the annual growth rate of value added of the service sector in percent of GDP, trade openness, and the corporate tax rate. We add controls for tax loss regulations, namely, a dummy for the presence of LCF or LCB regulations.[25]

We include country and year fixed effects at the cohort level. Standard errors are clustered at the country-cohort level, the level of treatment variation. The fixed effects structure in this analysis allows estimating the M&A effects on the country-level pre- versus post-treatment (first difference), relative to counterfactual deals in untreated countries (second

[23]Furthermore, the limited coverage of target financials, especially for non-reporting start-ups, would make a firm-level analysis, which includes additional financial information, non-representative of the small transactions that we aim to capture as well. Table 4 shows that a large part of our sample target firms are small according to EU size classification. Lastly, matching the measurement of our dependent variable to the country-level treatment variation aligns with our identification strategy, ensuring that changes in regulations are accurately reflected and avoids artificially inflating statistical power without additional identifying variation.

[24]Using country-level-target type aggregates in the M&A deal analysis, we overcome econometric concerns about skewed datasets due to many zero observations [Cohn et al., 2022]. We only have 20 zero observations in our dataset, which drop from the sample when considering the logarithmic outcome. When aggregating at the country-industry level the number of zero observations would be significantly larger.

[25]Our binary classification captures the material difference between restrictive and more lenient LCF provisions, reflecting that very short periods limit financial flexibility, while the marginal benefit of very long periods diminishes. In untabulated tests, we confirm that our results are robust to including the length of LCB and LCF periods.

difference) (within cohort). Differences in M&A, due to time trends across countries and time-invariant country characteristics, are eliminated. Controlling for other time-variant factors that influence the investment decisions in the same country, any remaining change in the treated versus the control country should be attributable to the change in anti-loss trafficking rules. In this M&A deal analysis, we reduce concerns that our estimates are affected by country-level confounds by splitting our analysis into treated loss and non-treated non-loss target firms within-country.

Second, we investigate the dynamic effects over time in a stacked event study:

$$Outcome_{ctl} = \alpha + \sum_{m=-4}^{4} \gamma_m * Treat_{cm} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl} \qquad (2)$$

The variables are defined as in Equation 1. We include the treatment at the event time as well as four leads and lags of the treatment indicator ($Treat$). The treatment indicators are binned at endpoints, such that t-4 would indicate treatment at time t-4 and all previous years, and t+4 would indicate treatment at t+4 and all following years. Hence, we do not interpret the coefficients for t-4 and t+4. Coefficients are normalized to zero based on the level in the period preceding the treatment (t-1).

4.2.3 Tax loss transfer, industry dynamics, and industry performance

Further, we estimate whether the market structure and overall industry performance in a country change in response to the introduction or tightening of anti-loss trafficking rules. We extend Equations 1 and 2 to the industry level (within a country), testing different industry-level outcomes. On the one hand, the more fine-grained aggregation level allows us to minimize the possibility of other simultaneous disturbances. By utilizing this aspect of the data, we can control for industry-specific shocks across countries and country-industry fixed effects. On the other hand, we maintain an aggregation at the industry level as a firm-level approach would fail to capture the externalities of reforms, as noted by Breuer [2021]. In this analysis, we aim to measure the impact of anti-loss trafficking rules not just on target firms, but on the entire industry. This includes potential acquirers, targets that choose not to pursue acquisitions post-reform, and firms that reduce risk-taking in response to the expectation of being less likely to be acquired. Ultimately, we seek to understand how the regulation affects resource allocation across the entire industry, rather than focusing solely on targets or acquirers.

With a view to market structure, we are interested in how the exit and entry of young firms are affected by anti-loss trafficking regulations. For this purpose, we examine changes in the survival rate of young entrant and firm entry measured by the birth rate in the industry.

Additionally, we examine overall industry performance by studying the impact of anti-loss trafficking rules on the country-industry performance measured as the average return on

assets (ROA) weighted by firm sales.[26] The weighting ensures that the measure of industry productivity is representative of the industry as a whole reflecting how it contributes to overall output - as if all firms in an industry were merged. In this way, it is also most informative from a policy perspective.

We control for the logged sum of total, fixed, and cash assets at the country-industry level in addition to the country-level control variables used in Equation 1.[27] In addition, given the extended country coverage in the productivity tests, it is now feasible to extend our institutional controls to account for escape clauses in anti-loss trafficking rules. Our industry-level specification includes industry-country and industry-year fixed effects at the cohort level. With this structure, we compare industry-country effects pre- versus post-treatment (first difference), relative to counterfactual industries from the same industry year in countries that are untreated (second difference) (within cohort). Standard errors are clustered at the industry-country cohort level.

5 Results

5.1 M&A

5.1.1 Baseline results

Anti-loss trafficking rules restrict the use of losses after substantial changes in ownership and could thus impair M&A.

Table 5 lists the regression results for the effect of these rules on the number of deals. The first two columns present the baseline results for the *ChangeALT* treatment indicator (column (1)) and the individual dummies for tightening and loosening of rules (column (2)) in the full sample. Rechbauer and Rünger [2023] demonstrate that previous year's earnings reliably proxy for the existence of LCFs. As main loss proxy, we thus use reported accounting losses to proxy for target firms that are more likely to have LCFs. We test robustness to alternative proxies below. Columns (3) to (6) display the estimates for subsamples of targets with (columns (3) and (4)) and without reported accounting losses in the year prior to the deal (columns (5) and (6)). All regressions include the full set of controls and fixed effects.

The baseline results show a negative and significant coefficient for the number of deals of -0.20[28] within treated countries, relative to within control countries after treatment (Table 5, column (1)). This is equivalent to an 18% decrease, and at the average number of M&A in our sample, it translates into a decrease of 39 transactions per country-year.

[26] We measure ROA in terms of pre-tax profits before interest (EBIT) to remove any tax effects.

[27] For tests with firm birth and survival rates, we cannot control for total, fixed, and cash assets. Eurostat does not provide the necessary data for industry-level controls and we cannot employ the industry controls derived from the full universe of firms in Orbis, as the Eurostat sample only contains a subsample of young companies.

[28] This translates into a decrease of -18% $= e^b - 1$, where b = -0.1974.

Generally, M&As are a very dynamic process with strong cyclicality. The volume of deals has a within-country standard deviation of 88 which is about 41% of the mean (215), indicating large fluctuations. Thus, our estimated effect is substantial yet within a plausible range, especially relative to prior studies of accounting-related policy changes. E.g., Bonetti et al. [2020] find that the EU transparency directive reduced the number of M&A by 17–18%, and Blouin et al. [2021] find an increase of 29% in M&A cash bids after the introduction of lenient tax deductions. Furthermore, effects are moderate as most of our target firms are relatively small; 65% qualify as small firms, and 86% fall under the small and medium-sized category based on the EU classification (see Table 4).

Decomposing our main effect, we find that tightening of legislation appears to reduce M&A with a coefficient size of -0.25[29], while loosening has a smaller significant effect (0.17)[30] (column (2)). In columns (3)-(6), we split the sample between loss and non-loss targets based on our proxy of a one-year accounting loss. The effects are driven by loss-making targets, for which we find much larger and significant effects (columns (3) and (4)). In this subsample, the overall effect amounts to -0.33.[31] The combined effect is driven by both tightening and loosening of legislation. For targets without identified losses, the coefficients show the same signs but are much smaller and lack statistical significance (columns (5) and (6)).

The difference in coefficients between loss and non-loss targets is statistically significant across all specifications as indicated in Table 6, where we employ a triple difference-in-difference design by interacting all right-hand side variables with the loss indicator. The third difference allows us to estimate the effect between loss and non-loss targets within the treated country. The interaction between the loss indicator and $ChangeALT$ (column (1)) confirms that significantly less deals are taking place involving loss-making targets as compared to profit-reporting targets after changes in anti-loss trafficking legislation. Furthermore, the within-country design allows us to tighten the identification and include country-year fixed effects. We report results of this extended specification in columns (3) and (4). The estimates confirm our previous findings, suggesting a reduction in M&A activity for loss targets of 0.24[32], with significant negative (positive) effects for tightening (loosening).

Figure 3 displays corresponding event study results. We observe a slight upward trend in the number of deals in the period before treatment, which is consistent with some deals being conducted in anticipation of tighter rules to come. However, overall we do not find pre-treatment trends in M&A; the sum of lead coefficients in the pre-period is not statistically significantly different from zero. This observation gives us confidence in the validity of the underlying parallel-trends assumption. As apparent, loss-making firms are driving the overall decline in deal numbers in treated relative to control countries. In loss targets, the number of deals shows a significant decline from the first year after the change in legislation, which persists.

[29]Decrease of -22% = $e^b - 1$, where b = -0.2503.
[30]Increase of 19% = $e^b - 1$, where b = 0.1739.
[31]Decrease of -28% = $e^b - 1$, where b = -0.3287.
[32]Decrease of -21% = $e^b - 1$, where b = -0.2378.

To quantify the aggregate impact of the reforms, we provide a back-of-the-envelope calculation, estimating a loss in deal values of EUR 80 billion per year in Europe at the end of our sample period (2019). We derive this range as follows: In 2019, the European countries with stringent anti-loss trafficking rules (category 3-4 in Table 1) had M&A transactions in the order of EUR 781 billion [33] (total deal values in Europe in 2019 were EUR 2.6 trillion[34]). In Table 5 column (3), our estimates imply that a loosening of these anti-loss trafficking rules would increase the volume of M&A with loss-making targets by 28% and, based on the available financial information of target firms, 36.5% of target firms are loss-making. Hence, the anti-loss trafficking rules in place in 2019 inhibited approximately EUR 80 billion of M&A transactions (28% x EUR 781 billion x 36.5%) per year.

5.1.2 Additional analyses and robustness checks

We explore the robustness of our results by running a comprehensive set of additional analyses. In Table 7 Panel A, we test whether effects depend on the size of losses. In line with the hypothesis that larger loss tax shields attract acquirers, we find that effects are concentrated in targets with above-median losses. For targets with small losses, effects are statistically insignificant. In Table 7 Panel B, we show the results when we expand the accounting loss window to include net cumulative pre-tax earnings over the past four years prior to acquisition. This proxy reflects the fact that LCF periods across our sample countries span from four years up to unlimited in some cases, i.e., all treated firms can utilize a LCF for at least four years.[35] In both tests, the results are in line with our baseline analysis.
In the Appendix, we conduct a battery of further tests to better understand the drivers of the effects we observe. First, as described in Table 1, differences in the stringency of anti-loss trafficking rules exist: while some countries forfeit losses if ownership is changed, others have less strict rules that only apply upon a change in ownership *and* activity (a cumulative regime). Table 19 in the Appendix F.2 displays the results when we distinguish between these different rule types. As expected, we find that the baseline negative effect is driven by stricter anti-loss trafficking rules (those exclusively based on ownership change criteria). The coefficient on M&A volume for less restrictive anti-loss trafficking rules (those based on ownership and activity change criteria, i.e., cumulative regimes) is smaller in size and not statistically significant. Overall, these results indicate that particularly ownership-based regimes hurt M&A activity. Second, to control for firm-specific factors and potential confounders, we complement our country-level M&A analysis with a firm-level analysis of

[33] We derive that value by multiplying the number of deals by mean deal value in 2019 in the stringent anti-loss trafficking rule countries (EUR 134.804 million $\times$ 5,796). The mean deal value is derived based on available information from a subset of target firms.

[34] Source: Institute for Mergers, Acquisitions and Alliances (IMAA) in Statista M&A values by region, available here IMAAData.

[35] We chose a four year window, because a profit history of four years is available for 75% of firms with financial information in our sample and using a uniform proxy across countries ensures comparability and consistency of our estimates.

acquisition probabilities, following the approach of Ortiz et al. [2023] (see their section 3.2). This design allows us to rule out that differences in M&A volume are driven by industry-specific time trends, time-invariant industry characteristics or target firm size. Consistent with our country-level findings, firms with large LCFs are significantly less likely to be acquired following anti-loss trafficking tightening (Appendix Table 20). We ensure that this firm-level result is robust across different loss proxies.

Third, we consider the volume of M&A deals relative to the number of firms in a country-year to confirm that the drop in M&A activity detected in the baseline test is not driven by a shrinking pool of viable targets (see Appendix Table 21). Finally, our results remain robust when using country-specific ownership thresholds (Appendix Table 22) and when controlling for the presence of general anti-avoidance rules (GAARs) (Appendix Table 23). The results show that GAARs do have an effect on M&A activity, especially on loss targets, which suggests that they inhibit tax-driven M&A to some extent. However, controlling for GAARs does not affect our main coefficients. Thus, this test gives the first indication that anti-loss trafficking rules could go beyond hindering tax-driven M&A and also affect value-generating transactions, a question we further explore in the next sections. Alternatively, GAARs are less effective in preventing tax avoidance related to loss trafficking.

Taken together, these robustness tests support the conclusion that anti-loss trafficking rules significantly affect M&A activity in targets with losses. In the following, we provide two additional firm-level country case studies, which allow us to rely on true tax LCF data, a main limitation of our previous analyses.

5.1.3 M&A firm-level analyses

So far, we proxied tax losses with accounting data. We need this proxy as tax LCFs are typically not reportable under financial accounting regulations in Europe. Tax return data are not publicly available across Europe. Thus, we exploit two additional settings and data sources that allow us to obtain the true tax LCF. We begin by combining our M&A sample with Compustat data on US acquirers, where we can obtain the US acquirers' reported tax LCF. Second, we obtain access to Norwegian administrative tax and firm financial data covering the universe of Norwegian firms, which allows us to directly measure the relevance of target LCFs for M&A around the Norwegian introduction of anti-tax loss trafficking regulation in 2004.

These alternative data sources also have a better coverage of acquirer (US case) or target (Norway case) financials, which are unavailable in the main sample. Thus, we move these analyses to the firm level, where we can control for firm characteristics. We explain these additional analyses in detail in the following.

5.1.3.1 Change in US acquirers' reported tax losses

First, we shift the focus of our analysis to the acquirers for additional evidence. While data on the true LCF is not readily available in Orbis, Compustat provides this information for

publicly listed US companies, which pose a substantial share of the acquirers in our sample. In our regression sample, 27% of acquisitions are by foreign acquirers. The US is the most important foreign acquirer overall, with about 24% of foreign acquisitions. We match our Zephyr acquirer data to Compustat and build a panel dataset of US acquirers with at least one deal in our target countries over our sample period.

We investigate which effect the acquisition of loss targets in European countries with versus without anti-loss trafficking legislation has on the tax LCF reported by the US acquirers. If acquirers are able to use the LCFs by transferring loss benefits, we should observe an increase in reported tax LCFs after target acquisitions where targets are loss-making. If anti-loss trafficking rules are introduced or tightened, we expect a decrease in acquirer LCFs relative to pre-reform outcomes. The regression equation reads as follows:

$$\begin{aligned} AcquirerTaxLCF_{a,t} = \alpha + \beta_1 * ALT\_Acquisition_{a,t} + \\ \beta_2 * ALT\_Acquisition_{a,t} * LossTarget_b + \gamma * Acquisition_{a,t} + \\ \rho * X_{a,t} + \sigma * FE_{t,i} + \delta * FE_a + \epsilon_{a,t}, \end{aligned} \tag{3}$$

where a stands for acquirer, b for target, i for acquirer industry, and t for year. We scale the dependent variable, acquirer's reported tax LCF, by total assets.
$ALT\_Acquisition_{a,t}$ is a dummy variable equal to 1 if the acquirer buys a target in a country that employs anti-loss trafficking rules and zero otherwise. $LossTarget_b$ is a dummy variable equal to 1 if the target reports an accounting loss in the year before the deal and zero otherwise. We control for the general effect of a deal occurring in our target countries with $Acquisition_{a,t}$, which is equal to 1 if there is a deal in any target country in a given year and zero otherwise. We include fixed effects at the year-industry and acquirer firm level. We add acquirer-level controls based on the variables Heitzman and Lester [2021] identified as determinants of LCF benefits.[36]

We present the estimates in Table 8. We report results for all deals across all target types (column (1)) and interacted with the loss target indicator (column (2)). Our results indicate that, on average, US companies that acquire firms in countries with anti-loss trafficking rules report a 8 percentage point smaller tax LCF relative to total assets as compared to US companies that acquire firms in countries without anti-loss trafficking rules (column (1)). At the median (average) of acquirer assets this implies a loss in benefits from anti-tax loss trafficking rules equal to USD 91 (526) million.[37] Column (2) demonstrates that this effect is concentrated in acquisitions of loss target firms (as proxied by our baseline one-year loss measure). Namely, our results in column (2) show that US firms report a significantly higher tax LCF if they buy a target that is likely loss-making. This effect is offset if the target country restricts the transfer of LCFs, suggesting that US acquirers do not gain LCFs if they are restricted by anti-tax loss trafficking legislation.

[36]Please refer to the table notes.

[37]USD 91 (526) million is derived by multiplying the coefficient of 0.0773 with the median (mean) acquirer asset's value of USD 1,174 (6,799) million.

5.1.3.2 M&A in Norway around the 2004 reform

In a second case study, we utilize administrative Norwegian tax data on the true value of LCFs and exploit the introduction of an ownership-based anti-loss trafficking rule in 2004. If control of a company changed, the use of accumulated LCF was denied according to the new legislation if it was probable that the utilization of the losses was the predominant motive for the transaction.[38]

We gain access to administrative data in Norway.[39] The data comprises confidential tax returns allowing us to build a precise measure of tax LCF and micro-level corporate and financial data on Norwegian firms from the national company registry. The company registry data enables us to trace deals as well as key firm characteristics.[40] We restrict our sample period to the years from 2002 to 2006 because of data availability and to be consistent with the main analysis.

In Table 9 Panel A, we present descriptive statistics on the key variables for the sample used in our analysis. We have a total of around 1,945 deals for our final sample period, of which 459 involve a loss-making target.

Exploiting the granularity of the Norwegian data, we run tests at the firm level on the whole universe of Norwegian entities. Similar to above, we follow Ortiz et al. [2023] (see their section 3.2), who study how increased mandatory disclosure rules shape the acquisition probability of a target. For this purpose, we run the following linear survival probability model:

$$\begin{aligned} DummyAcquired_{i,t} = \alpha + \beta_1 * Post_t * TaxLCFTarget_{i,t} \\ +\rho * X_{i,t-1} + \sigma * FE_j + \delta * FE_t + \epsilon_{i,t}. \end{aligned} \tag{4}$$

The outcome variable $DummyAcquired_{i,t}$ is a dummy variable indicating whether the firm i is targeted in year t. We regress it on $Post_t$, which is a dummy variable equal to one for the years from 2004 onwards, and on $TaxLCFTarget_{i,t}$, which is a dummy variable equal to one if a target has a LCF in $t-1$. We also control for company characteristics that correlate with the likelihood of being a target following prior literature [Amberger and Robinson, 2024, Bird et al., 2017, Ortiz et al., 2023] as well as tax planning. Specifically, we control for $Size$ (the natural log of assets), $Leverage$ (long-term debt over total assets), ROA (net income

[38]The reform was passed under the Legislative Act of 10 December 2004, Number 77, and included until 2019 in paragraphs 14-90; see here LegislativeAct2004. From 2019 onwards, paragraphs 14-90 have been repealed, and instead, the anti-loss trafficking rules are part of paragraphs 13-3, see here LegislativeAct2019. An escape rule allows the restriction to be lifted if the company can provide evidence that the main reason behind the deal is an economic one and not tax-driven. From bilateral talks with local tax advisors, we learned that the possibility to apply the escape rule is hard to predict pre-deal as the criteria to establish what constitutes a tax-driven deal are uncertain. Thus, the tax LCF is usually disregarded during the target valuation process.

[39]Data are accessed through the fellowship at Skatteforsk. See here Skatteforsk.

[40]In Appendix E, we provide a detailed description of the data we gather for Norway and how we construct the variables for the regression analysis.

over total assets), *SalesGrowth* (the difference between sales in t-1 minus t-2 over sales in t-2), *IntangibleIntensity* (intangible assets over total assets), *CashETR* (total tax paid over taxable income). All control variables are included at $t-1$. We include industry and year fixed effects. The chosen fixed effect structure enables us to estimate the effect on M&A probability pre- versus post-treatment (first difference), relative to counterfactual deals in untreated industries (second difference). This way, we rule out that differences in M&A volume are driven by time trends across industries or time-invariant industry characteristics. Standard errors are clustered at the firm level.

Table 9 Panel B presents the regression results for the effect of the Norwegian anti-loss trafficking rule on M&A probability. We present the analysis with and without controls in column (1) and (2), respectively. We consistently find that the introduction of the anti-loss trafficking rules in Norway led to a statistically significant reduction in the probability of being acquired. Firms with an LCF are 0.1 percentage points less likely to be acquired post-2004 compared to targets without an LCF. Given an average acquisition probability of 0.004 across our sample period, the probability to be acquired relative to the mean probability over the whole sample is reduced by 30% post-reform for targets with LCF, which is close to our country-level estimate for loss targets. Overall, our within-country results using a precise measure to capture the existence of a tax benefit in the target support the baseline cross-country evidence confirming that anti-loss trafficking rules have a major impact on the market for corporate control.

5.2 Market structure: Young firm exit and entry

In addition to the direct effect on M&A, anti-loss trafficking rules can also indirectly affect the market composition if firms anticipate the deterrent effects of the restrictions (Dimopoulos and Sacchetto [2017]). The regulations raise the effective cost of downside risk and tend to particularly affect young firms. Young firms cannot typically offset their losses with income from other business lines (Henrekson and Sanandaji [2011]) and rely on equity financing to grow, which frequently requires substantial changes in the set of owners. As a result, new companies may give up at an earlier point if they perceive the acquisition probability as small. Furthermore, the restrictions could discourage the founding of new firms. We thus look at changes in the survival[41] and birth rates. We adjust Equation 1 and Equation 2 and conduct the analysis at the industry level.

In Table 10, we analyze the impact of changes in anti-loss trafficking rules on four-year-old

[41]Note that survival in our dataset allows for acquisition. Only firms that stop operating are considered dead (see the variable definition in Appendix A for more details).

entrants' survival rates (columns (1)-(2))[42] and enterprise birth rates (columns (3)-(4)).[43] All regressions include the full set of industry-year and industry-country fixed effects and country control variables. In each group, the first column displays the results for $ChangeALT$ as the main variable of interest. We decompose the regression coefficient to study the differential effect of tightening and loosening of the anti-loss trafficking rules in the second column, showing the results for $TighteningALT$ and $LooseningALT$.

We find a strong negative effect of $ChangeALT$ on survival rates of about -4 percentage points (column (1)). The effect of tightening and loosening is almost symmetric (3 versus 4 percentage points, column (2)). This result suggests that the decreased acquisition likelihood reduces survival chances and leads to more young firms exiting the market, i.e., start-up ideas are more likely to be abandoned early-on.

For tightening and loosening, our estimates indicate an average increase in birth rates of around 3 and 1 percentage points, respectively (column (4)).[44]
This finding can be explained by two opposing effects. Loosening anti-loss-trafficking rules lowers the effective tax rate, decreasing the required rate of return, especially for risky projects with downside risks. As a result, the birth rate of new firms increases. A tightening of the rules involves the opposite dynamics, thereby lowering the birth rate as potential entrepreneurs will incur a higher risk of failure. In addition, the response of underperforming firms might lead to asymmetric effects. The financial incentives from the tax benefits might encourage "zombie firms", i.e., loss-making firms with some probability of turning profitable again, to stay alive. However, continuing these firms might only lead to the accumulation of further losses. A tightening of anti-loss-trafficking rules raises the cost of this downside risk, leading many such firms to exit and potentially making room for new, more productive entrants. However, this effect may not be mirrored under loosening, since re-entry of low-productivity firms is slower. The positive effect for tightening in legislation indicates that the freed-up market space effect outweighs the higher downside risk. This might relate to the timing of the effects, given that entrants observe the market concentration at the point of entry, while risk and return considerations might become relevant and salient only later in

[42]Importantly, we do not consider younger entrant survival (one- to three-year-old entrants), as these firms are founded just a few years before, just around or even after our post-treatment period (one to five years after the law change), and therefore treatment (or treatment anticipation) can affect the entry probability of these firms, which would distort our measure of survival probability. Our results are robust to using the five-year instead of the four-year survival rate. (Five-year survival is the last available measure in the Eurostat database.)

[43]We scale firm births by active enterprises to account for the size of the existing business ecosystem, enabling us to accurately reflect the relative growth of entrepreneurial activity in comparisons across different industries, countries, or years. Our results are robust to using the unscaled number of firm births (see Appendix Table 24).

[44]The overall effect (column (3)) is negative as we set the Change indicator to 1 for tightening and -1 for loosening of legislation. Thus, a positive loosening coefficient will be translated to a negative effect in the aggregated ChangeALT indicator. For birth rates, both tightening and loosening positively affects our outcome, violating our symmetry assumption for the combined indicator. Thus, we refrain from interpreting the change indicator for this test.

the firm life cycle. Entrepreneurs could underestimate their loss probability and the potential impact of tax loss transfer restrictions at a later point of their venture. Finally, and more generally, non-tax factors (such as increased market space) might be more prevalent when deciding whether (or not) to establish a new company.

We confirm the difference-in-differences results in a dynamic event study analysis presented in Figure 4, where Panel (a-b) depicts the estimates for enterprise births and Panel (c) for enterprise survival. The figure indicates that the effect is immediate (particularly in survival) and persistent in both cases and that the treated and control groups show parallel trends in the pre-periods.

We conduct a battery of robustness tests. In the Appendix, we show that results are overall robust to entropy balancing (Table 27), removing control variables (Table 31), and excluding one treatment country or cohort at time to rule out that effects are driven by specific countries and cohorts (Figure 11 and 12).

In sum, our results show that anti-loss trafficking rules not only directly affect M&A but also indirectly influence young firms' entry and exit. Tax loss transfer restrictions reduce the survival of start-ups when tightened and facilitate business continuation when loosened. Birth rates are asymmetrically affected, due to the interplay of lower costs for downside risk with loosened legislation, and increased market space due to increased deaths of underperforming firms upon tightened rules.

5.3 Industry performance

5.3.1 Baseline analysis

We continue to investigate how anti-loss trafficking rules affect industry performance to better illuminate the desirability of the legislation. A priori, it is unclear how the decrease in M&A activity will materialize in overall industry performance. Purely tax-driven acquisitions of loss-making targets could, on average, be prevented, while, at the same time, such rules may also immediately dampen industry performance by limiting the realization of M&A synergies. Furthermore, indirect effects such as the earlier abandonment of start-up ideas or increased firm entry could additionally affect industry performance. We use industry-level mean return on assets, weighted by firm sales in the industry, to capture effects on industry performance.

Table 11 presents the difference-in-differences results for the effect of the anti-loss trafficking rules on industry performance (columns (1) and (2)). Again we start with $ChangeALT$ as overall measures and then differentiate between tightening and loosening of legislation. We find consistent negative (positive) results for tightening (loosening) in legislation, with an overall 0.7 percentage point decrease in industry performance. Relative to the mean ROA of about 9 percent across the whole sample, the effect is economically sizable at an 8% impairment.[45] The effect seems to be driven by introduction or tightening of legislation, as

[45]To address concerns that changes in the denominator (total assets) might be influencing our ROA-

we find a larger effect for $TighteningALT$ (column (2)).
This evidence indicates that the reduction in deal activity might not be solely driven by tax-motivated M&A. The overall decrease in productivity we detect could be driven by the two channels discussed in our hypothesis section (section 3.2): First, anti-loss trafficking rules can deter value-creating ownership changes, particularly for firms needing financing to scale operations. Second, stricter anti-loss trafficking rules may also discourage potential targets from taking on risk, since losses become harder to offset. These channels will be particularly relevant for higher-risk, higher-reward ventures, such as companies in R&D-intensive industries.
Consequently, we split our sample by high and low R&D intensity. R&D-intensive firms are more likely to accumulate idiosyncratic losses from risky investments. We use an industry-level R&D intensity indicator based on the OECD Taxonomy of Economic Activities, which clusters activities according to their level of R&D expenditure to value added (see Galindo-Rueda and Verger [2016]). To apply the EU taxonomy of R&D intensity to our data, we must match the industry classification to the NACE2 classification used in our sample. In case an NACE2 category falls in more than one EU category, we always assign the industry to the lower category with respect to R&D intensity. We build a binary measure of R&D intensity, such that we define all industries as R&D-intensive if the EU taxonomy classifies them as medium-high or high R&D-intensive, and all industries in our sample of medium, medium-low, or lower R&D intensity as low R&D-intensive.
We present results for high and low R&D industries in columns (3) and (4), and columns (5) and (6), respectively. We indeed find that the decrease in productivity is more pronounced in high R&D-intensive industries, indicating that performance is reduced in particular in innovative industries, where funding of new ideas and start-up culture is a key productivity driver.
We formally test the difference between the two groups in a triple difference-in-differences design by interacting all right-hand side variables with the industry indicator. This design also allows us to exploit the within-country variation in firm industry affiliation, controlling for country-year shocks with country-year fixed effects. The interaction of the R&D intensity dummy with the change dummy is negative and statistically significant as indicated in Table 12 (p-value: 0.006). When taken apart, statistical power is weaker, but the loosening effect remains statistically significant at a p-value of 0.017, and tightening is insignificant with a p-value of 0.101.
The event study in Figure 5 further corroborates our main findings. It shows a very immediate and substantially larger effect in high R&D industries relative to low R&D industries.

productivity results, we conducted a test using the sales-weighted industry mean of total assets as the dependent variable, employing the same specification as our productivity analysis but excluding asset-related controls. This test examines whether total assets increase following changes to anti-loss trafficking rules, particularly if investment shifts toward less risky capital assets, which would increase the denominator and mechanically reduce ROA. Untabulated results show that total assets decrease—or remain unchanged—after the tightening of anti-loss trafficking rules (and vice versa after loosening), suggesting that any observed ROA decline is not driven by denominator effects.

We do not observe a significant difference between control and treated country industries in the pre-treatment period.

We present several robustness tests in the Appendix. The productivity results are robust to entropy balancing (Table 28), removing control variables (Table 32), and excluding one treatment country or cohort at time to rule out that effects are driven by specific countries and cohorts (Figure 13).

Overall, our findings in this section indicate that anti-loss trafficking rules impair aggregated industry performance, especially in R&D-intensive industries. The observed decline in M&A activity could purely reflect the elimination of tax-motivated transactions under anti-loss trafficking rules. If all prevented transactions were unproductive, their removal could lead to higher industry-level productivity. However, we instead find that overall industry performance declines, indicating that anti-loss trafficking regulations may also deter value-enhancing deals. To shed more light on the underlying mechanism of our findings, we conduct additional tests on the "ownership-synergy channel" (section 5.3.2.1) and "risk-taking channel" (section 5.3.2.2) below.

5.3.2 Mechanisms

5.3.2.1 Ownership-synergy channel

The "ownership-synergy channel" suggests that anti-loss trafficking rules can hinder value-creating ownership changes, particularly for financially constrained firms, such as start-ups with early losses that rely on external funding to grow.
To test this mechanism, we follow the approaches by Ortiz et al. [2023] and Blouin et al. [2021] and estimate changes in deal synergies for targets and acquirers using a stacked cohort difference-in-differences design. The regression equation reads as follows:

$$\begin{aligned} Synergy_{f,t} = \alpha + \beta_1 * PostDeal_{ft} * ChangeALT_{ct} \\ +\rho * X_{ct} + \sigma * FE_{it} + \delta * FE_c + \epsilon_{ft}. \end{aligned} \tag{5}$$

The outcome variable $Synergy_{i,t}$ measures the synergies, defined as target or acquirer pre-tax ROA changes around M&A,[46] respectively. $PostDeal_t$ is a dummy equal to one in the years after the deal, and $ChangeALT_i$ indicates changes in anti-loss trafficking rules. We include the same country-level controls as in the main specification, as well as industry-year and country fixed effects, or alternatively, industry-year and firm fixed effects.
We present results in Panel B of Table 13, differentiating between target (columns (1) to (4)) and acquirer synergies (columns (5) to (8)). We find significant post-deal productivity gains following the loosening of anti-loss trafficking rules, especially for targets. In our most restrictive specification, loosening legislation leads to an increase in target synergies by 1.7 percentage points (column (4)), while acquirers benefit from a 0.9 percentage points increase

[46] As in all our analyses, we measure ROA in unconsolidated accounts as we do in the rest of our analyses to avoid contamination from other entities within the same group.

(column (8)). Relative to the mean, these effects translate into sizable increases in post-deal synergies of 22% and 12%, respectively. Coefficients for tighter legislation are negative, but insignificant.
In sum, the evidence supports the "ownership-synergy channel," showing that loosening anti-loss trafficking rules enhances post-deal productivity for both targets and acquirers, with stronger effects for targets. These findings suggest that easing restrictions on LCF transfer facilitates value-creating ownership changes and improves firm performance following acquisitions.

5.3.2.2 Risk-taking channel

The "risk-taking channel" suggests that stricter anti-loss trafficking rules discourage firms from taking risks, since losses become harder to utilize. This reduces investment in innovative ventures and lowers industry-level profitability.
We explore this mechanism by adapting Equation 1 to examine changes in industry-level risk-taking. We measure risk as the sales-weighted industry-level average of ROA volatility over three-year windows. We include our country- and industry-level controls, along with industry-year and country-industry fixed effects.
Panel A of Table 14 reports the results. In our benchmark specification (columns (1) and (2)), risk taking declines by approximately 0.4 percentage points following anti-loss trafficking tightening and increases by 1.1 percentage points following loosening. This suggests that reduced (increased) risk-taking contributes to lower (higher) industry performance after anti-loss trafficking regulation is tightened (loosened). To test robustness, column (3) follows the fixed effects strategy from Langenmayr and Lester [2018], dropping country-industry fixed effects while keeping industry-year fixed effects. Thus, this specification leverages also between-country variation in anti-loss trafficking rules, and results remain consistent. Column (4) excludes industry-level controls (total industry assets, cash, and fixed assets) as these might be indirectly affected by the anti-loss trafficking rules as well. The findings persist.
Since the loss of LCFs only occurs upon changes in ownership, these risk-taking effects should primarily affect firms expecting to be acquired. We therefore focus in on firms that become acquisition targets within the next five years, measuring their risk-taking behavior before the deal after anti-loss trafficking rule changes. For this purpose, we conduct an analysis at the target level. As a dependent variable, we calculate the industry-adjusted pre-deal ROA volatility of future targets. We add firm-level controls to control for target productivity, size, leverage, and cash, as well as country-industry and industry-year fixed effects. Following Langenmayr and Lester [2018] we add additional controls for country risk factors, listed in Appendix A.
Panel B of Table 14 shows that future targets exhibit lower risk-taking following anti-loss trafficking tightening, and higher risk-taking after anti-loss trafficking loosening-prior to deal occurrence and holding other target characteristics constant (columns (1) and (2)). In

percentage terms, our main effect indicates a decrease in target risk-taking of 12% in response to anti-loss trafficking rules, relative to the sample mean. These findings are stronger when removing target controls (columns (3) and (4)). We caution that these results may partially reflect acquirer selection rather than only risk-adjustment of future targets, i.e., firms with lower risk profiles may be more likely to be acquired after anti-loss trafficking tightening. Still, this alternative explanation is consistent with our core hypothesis: stricter anti-loss trafficking rules reduce incentives for risk-taking.
Overall, the results support the "risk-taking channel" by showing that stricter anti-loss trafficking rules significantly reduce industry-level risk-taking. Further analysis of future acquisition targets confirms that firms expecting to be acquired reduce risk-taking following anti-loss trafficking tightening, reinforcing the idea that stricter rules dampen incentives for innovation and risk. While acquirer selection may partially explain these patterns, the overall evidence aligns with the hypothesis that tighter anti-loss trafficking regulations discourage risk-taking and may hinder productivity growth.

5.4 Robustness checks

We conduct several additional robustness tests to ensure that our results on M&A activity, young firm entry and exit, and industry performance are not driven by spurious correlations or confounding factors. To address the possibility of confounding tax reforms coinciding with anti-loss trafficking rule changes, we control for other tax policy changes (e.g., corporate tax rates, LCF/LCB reforms) in all regressions. We describe possible confounding events in Appendix D. Untabulated results are robust to excluding events with large concurrent tax rate changes, which we define as rate changes exceeding three percentage points.

A concern for our identification could be that the decision to change anti-tax loss trafficking rules is systematically correlated with economic conditions in the treated countries, and our findings would then be confounded by spurious correlations. If so, countries that adopt anti-loss trafficking rules would have differing trends with regard to core economic factors, compared to countries in our control group (countries without a change in anti-loss trafficking legislation). To address this concern, we show in robustness tests in Figure 6 that pre-trends in important economic outcomes, GDP, and trade (as defined in Appendix A) are parallel between our treated and control groups. This approach follows similar tests of Fuest et al. [2018].

To further ensure comparability, we re-estimate our main specifications using entropy balancing on pre-treatment GDP and trade (Hainmueller and Xu [2013]). Entropy-balancing reduces potential bias introduced by co-variate differences, allowing for more reliable estimation of causal effects and enhancing the validity of our causal inferences.[47] We find consistent results (Appendix F.4.1).

[47] Athey and Imbens [2017] describe this approach Hainmueller and Xu [2013] introduced for a generalized matching as substantial improvement beyond the standard difference-in-differences analysis: "This method builds on difference-in-differences estimation, but uses systematically more attractive comparisons."

Next, to address concerns that control variables may be endogenous, we re-estimate our main specifications excluding controls. Results remain robust (Appendix F.4.2).

Finally, the staggered introductions of the regulations that are widely spread over our sample period reduce concerns about concurrent shocks, as does the within-country triple difference-in-difference analysis we conduct. Still, to rule out that results are driven by specific countries or cohorts, we exclude one treatment country or cohort at a time. Estimates remain stable and significant, confirming that results are not driven by outliers (Appendix F.4.3).

6 Tax revenue effects

So far, we have evaluated the economic consequences of anti-tax loss trafficking rules. In this last section, we provide a tentative descriptive analysis of the positive revenue implications of these regulations, which also have to be taken into account when trading off costs and benefits.

At the aggregate country level, LCFs can represent very substantial amounts. For instance, the German Federal Statistical Office reported that in 2020 German corporations declared a total stock of EUR 751 billion in LCFs – an amount nine times greater than the total corporate income tax revenue of EUR 84 billion.[48] If a significant portion of these LCFs were utilized to offset taxable income, it could lead to considerable reductions in tax revenues. Consequently, a key motivation for implementing anti-loss trafficking rules is to safeguard corporate tax revenues.

To explore the fiscal implications of such rules, we use country-level data on corporate income tax revenues from Eurostat. Figure 7 illustrates the evolution of corporate tax revenues in reforming countries around anti-loss trafficking rule changes. We normalize corporate tax revenues to the year preceding each reform and estimate revenue dynamics around the reform while controlling for country and year fixed effects. We find that revenue tends to increase following the tightening of anti-loss trafficking rules, and conversely, declines when such rules are loosened. The point estimate suggests a 13% change in corporate tax revenue, though the confidence interval is very wide and includes zero, indicating statistical uncertainty. From a policy perspective, the potential loss in tax revenue from relaxed anti-loss trafficking regulations may be justified by the associated gains in firm survival and productivity. However, this may also hold true for alternative reforms that reduce the corporate tax burden.

While we do not claim causal identification when making these revenue estimates, the evidence suggests that tighter anti-loss trafficking rules may increase tax revenues by limiting the use of loss offsets in acquisitions. Our findings highlight a core policy trade-off: although these rules constrain economically beneficial transactions, they also enhance the integrity

[48] DeStatis (n.d.), *Über 39 Milliarden festgesetzte Körperschaftsteuer in 2020*, available here GermanLCF-Statistics. The total EUR 84 billion includes EUR 45 billion of municipal business tax revenue.

and yield of the corporate tax base.

7 Conclusion

This paper provides the first systematic evidence on the broader economic effects of anti-loss trafficking rules. By hand-collecting institutional data across European countries and combining it with firm-, industry- and country-level information, we show that these rules significantly influence the market for corporate control, firm dynamics, and industry performance.

We find that limiting the transfer of tax losses reduces M&A activity, particularly for loss targets, consistent with the idea that tax-motivated deals become less attractive. Using both cross-country and firm-level data, we show that these effects are concentrated in transactions where tax losses are most valuable. Furthermore, we demonstrate that anti-loss trafficking rules shape firm behavior beyond M&A—affecting start-up survival, firm entry, and productivity, particularly in R&D-intensive sectors where risk-taking and idiosyncratic losses are part of the business model. We confirm our results in different datasets (including country cases in the US and Norway where we observe the tax LCF) and a battery of robustness tests.

Ultimately, policymakers face a trade-off. Our descriptive statistics confirm that tax revenues may increase when restricting the loss transfer after ownership changes. Yet, we document that such rules also come with unintended economic consequences. Tighter restrictions may impede capital reallocation, suppress innovative activity, and weaken industry productivity. Thus, gains with respect to tax revenues must be weighed against potential long-term costs to innovation and growth.

Overall, our findings offer a new perspective on tax policy design: measures aimed at preventing tax avoidance may inadvertently hamper economically valuable transactions and distort industry dynamics. Future research could further explore the revenue-growth trade-off using richer administrative tax data.

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Tables and figures

Table 1: Anti-loss trafficking rules categories

Stringency	Regime name	Description
0	No regime	No explicit anti-loss trafficking rule
1	Cumulative	Denial of loss transfer after change in ownership and activity (cumulative requirement)
2	Activity-based	Denial of loss transfer after change in activity
3	Ownership-based	Denial of loss transfer after change in ownership
4	Activity- or ownership-based	Denial of loss transfer after change in ownership or activity (fulfillment of one criteria sufficient)

Source: Bührle and Spengel [2020].

Table 2: Changes in anti-loss trafficking rules in the EU27, Norway and United Kingdom

Country	Year	Change
Tightening		
LT	2002	Introduction regime *cumulative activity and ownership change* (66%)
CZ	2004	Introduction regime *cumulative activity and ownership change* (25%)
NO	2004	Introduction regime *ownership change* (control)
SI	2005	Introduction regime *ownership change* (25%)
PT*	2006	Change regime *activity change* to *activity or ownership change* (50%)
DE*	2008	Change regime *cumulative activity and ownership change* (50%) to *ownership change* (25-50% pro-rata, 50% fully)
HR*	2010	Introduction regime *cumulative activity and ownership change* (50%)
HU	2012	Introduction regime *cumulative activity and ownership change* (majority)
GR	2014	Introduction regime *ownership change* (33%)
Loosening		
LV	2000	Change regime *ownership change* (50%) to *cumulative activity and ownership change* (control)
HU	2001	Abolition regime from *ownership change* (50%)
NL	2001	Change regime *ownership change* (30%) to *cumulative activity and ownership change* (30%)
SI*	2007	Change regime *ownership change* (25%) to *cumulative activity and ownership change* (50%)
PT	2014	Change regime *activity or ownership change* (50%) to *ownership change* (50%)
ES	2015	Change regime *ownership change* (majority) to *cumulative activity and ownership change* (majority)
DE	2016	Change regime *ownership change* (25-50% pro-rata, 50% fully) to *cumulative activity and ownership change* (50%)
GR**	2018	Change regime *ownership change* (33%) to *cumulative activity and ownership change* (33%)

Notes: Changes in treatment of tax losses after an acquisition. Ownership-based are more restrictive than activity-based regulations. Cumulative rules are the least restrictive type of anti-loss trafficking rules. Retro-actively applicable rules are disregarded. Percentages in brackets indicate threshold for substantial change in ownership as defined by the law. * dropped from main analysis due to Financial Crisis (all treatments 2 years around the crisis year 2008), ** dropped from stacked design due to repeated treatment in a time window <5 years. *Source:* Update of Bührle and Spengel [2020].

Table 3: Descriptive statistics by treated and control

Panel A: Country-Level Descriptives

	Controls				*Treated*			
Variable	N	Mean	Std. Dev.	Median	N	Mean	Std. Dev.	Median
Number of M&A	1,330	215.514	402.866	92	118	214.407	344.657	60
Number of M&A (log)	1,330	4.354	1.525	4.522	118	4.162	1.682	4.094
M&A to active enterprises	1,330	0.006	0.032	0.001	118	0.003	0.005	0.001
M&A to active enterprises (log)	1,330	-6.843	1.567	-6.867	118	-7.062	1.620	-6.677
Lagged GDP growth	1,330	1.931	3.260	1.892	118	0.794	2.935	1.492
Lagged GDP (log)	1,330	27.040	1.182	26.803	118	27.288	0.992	26.719
Audit quality	1,330	5.731	0.669	5.884	118	5.194	0.745	4.945
Service sector Growth	1,330	65.513	5.624	65.226	118	63.688	6.427	65.906
Population (log)	1,330	9.338	1.365	9.175	118	9.740	0.976	9.295
Lagged inflation	1,330	1.702	1.245	1.696	118	1.537	1.415	1.532
Trade (log)	1,330	4.545	0.561	4.407	118	4.338	0.232	4.293
CIT	1,330	27.932	7.479	28	118	29.269	3.210	29.5
LCF	1,330	0.889	0.315	1	118	0.729	0.446	1
LCB	1,330	0.301	0.459	0	118	0.339	0.475	0
EU membership	1,330	1	0	1	118	0.814	0.391	1

Panel B: Industry-Level Descriptives

	Controls				*Treated*			
Variable	N	Mean	Std. Dev.	Median	N	Mean	Std. Dev.	Median
Survival rate	23,264	0.564	0.135	0.552	1,643	0.475	0.103	0.470
Birth rate	23,419	0.102	0.055	0.092	1,547	0.104	0.053	0.097
Productivity	48,357	0.087	0.059	0.079	2,865	0.076	0.054	0.071
Risk taking	46,021	0.052	0.035	0.048	2,714	0.048	0.028	0.047
Total assets (log)	48,357	20.696	1.601	20.79	2,865	20.672	1.954	20.915
Fixed assets (log)	48,357	19.650	1.558	19.744	2,865	19.677	1.976	19.956
Cash assets (log)	48,357	18.237	1.489	18.26	2,865	18.245	1.700	18.351
Escape clause	48,357	0.534	0.499	1.000	2,865	0.760	0.427	1.000

Notes: The table shows the descriptive statistics for the variables in our country and industry analyses in the stacked sample by treated and control units. All variable definitions, including sources are provided in Appendix A.

Table 4: M&A target descriptives

Target-Level Descriptives	*Controls*				*Treated*			
Variable	N	Mean	Std. Dev.	Median	N	Mean	Std. Dev.	Median
Loss dummy	48,086	0.365	0.481	0	15,079	0.392	0.488	0
Loss amount (th EUR)	48,086	2,083.9	53,189.3	0	15,079	3,610.3	105,500.3	0
Total assets (th EUR)	35,470	32,926.4	117,211.5	43,65.5	12,815	51595.8	155,704.9	7585.0
Loss over total assets	35,470	0.1	0.258	0	12,815	0.09	0.229	0
Age	47,905	18.525	18.1	14	14,983	19.221	21.755	14
Small company	35,470	0.673	0.469	1	12,815	0.563	0.496	1
SME company	35,470	0.878	0.328	1	12,815	0.816	0.388	1

Notes: The table shows the descriptive statistics at the target-level in our M&A sample for targets with non-missing loss information and prior to aggregation and stacking of the sample. The one-year loss dummy is a dummy variable equal to one if a target has an estimated LCF based on the accounting data up to one year before the deal and zero otherwise. One-year loss amount is the amount of that loss. Total assets and age are the assets and age of the target in the deal year. Small company (SME) dummy is a dummy equal to one if the target company fulfills the EU definition of a small company (SME) and zero otherwise.

Table 5: Loss transfer and number of M&A

Outcome	*Volume of M&A Deals (log)*					
Sample	*Full Sample*		*Loss Targets*		*Non-Loss Targets*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.1974**		-0.3287***		-0.0858	
	(0.0920)		(0.0728)		(0.0972)	
Tightening ALT		-0.2503		-0.3673*		-0.0815
		(0.2815)		(0.2059)		(0.3026)
Loosening ALT		0.1739***		0.3116***		0.0877
		(0.0591)		(0.0611)		(0.0634)
Lagged GDP growth	0.0076*	0.0076*	-0.0010	-0.0010	0.0086	0.0086
	(0.0041)	(0.0041)	(0.0074)	(0.0074)	(0.0058)	(0.0058)
Lagged GDP (log)	-0.1927	-0.2199	-0.7922**	-0.8124**	0.6180*	0.6201*
	(0.2882)	(0.2782)	(0.3431)	(0.3639)	(0.3258)	(0.3138)
Audit quality	0.0252	0.0178	0.0662	0.0609	0.0060	0.0066
	(0.0909)	(0.0902)	(0.1210)	(0.1241)	(0.0923)	(0.0920)
Service sector growth	-0.0227**	-0.0238***	-0.0571***	-0.0579***	0.0080	0.0081
	(0.0092)	(0.0086)	(0.0144)	(0.0149)	(0.0100)	(0.0089)
Population (log)	2.6155**	2.6232**	7.3342***	7.3381***	-0.3979	-0.3986
	(1.0861)	(1.0888)	(1.1927)	(1.1991)	(0.6747)	(0.6708)
Lagged inflation	-0.0227	-0.0236*	-0.0295**	-0.0302**	-0.0106	-0.0105
	(0.0138)	(0.0136)	(0.0148)	(0.0146)	(0.0230)	(0.0233)
Trade (log)	0.4453	0.4343	1.1227***	1.1147**	0.4834	0.4843
	(0.3488)	(0.3527)	(0.4217)	(0.4256)	(0.3390)	(0.3405)
CIT	0.0102*	0.0106*	-0.0064	-0.0061	0.0132**	0.0132*
	(0.0057)	(0.0060)	(0.0075)	(0.0079)	(0.0065)	(0.0068)
LCF	0.1474	0.1454	0.1705	0.1691	0.0721	0.0722
	(0.1005)	(0.1005)	(0.1642)	(0.1647)	(0.0901)	(0.0904)
LCB	0.6328***	0.6577***	0.4706***	0.4887***	0.7062***	0.7042***
	(0.1127)	(0.1763)	(0.1598)	(0.1664)	(0.1117)	(0.1825)
Observations	1,448	1,448	714	714	734	734
Adjusted R-squared	0.9619	0.9619	0.9424	0.9423	0.9688	0.9687
Country-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on logarithm of number of M&A. In columns (3)-(4), the sample only includes targets with pre-deal losses, and in columns (5)-(6), the sample excludes targets with pre-deal losses. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. Specification: $M\&A_{ctl} = \alpha + \beta_j * ChangeALT_{ct} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl}$, where c stands for country, l for target type, and t for year. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level.

Table 6: Triple-interacted loss transfer and number of M&A

Outcome	*Volume of M&A Deals (log)*			
	(1)	(2)	(3)	(4)
Change ALT	-0.0858			
	(0.0969)			
Change ALT × Loss	-0.2430**		-0.2378***	
	(0.1211)		(0.0612)	
Tightening ALT		-0.0815		
		(0.3019)		
Tightening ALT × Loss		-0.2858		-0.3007*
		(0.3650)		(0.1663)
Loosening ALT		0.0877		
		(0.0633)		
Loosening ALT × Loss		0.2240**		0.2099***
		(0.0878)		(0.0574)
Observations	1,448	1,448	1,428	1,428
Adjusted R-squared	0.9647	0.9647	0.9693	0.9693
Country-Loss-Cohort FE	Yes	Yes	Yes	Yes
Year-Loss-Cohort FE	Yes	Yes	Yes	Yes
Year-Country-Cohort FE	No	No	Yes	Yes
Loss * Country controls	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked triple difference-in-differences regressions of change in anti-loss trafficking rules on the logarithm of number of M&A. All right-hand side variables are interacted with the dummy *loss*, indicating whether or not a target reports losses prior to the deal. In columns (1)-(2), we rerun the main specification with the interactions. In columns (3)-(4), we add country-year fixed effects. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. Specification (1)-(2):
$M\&A_{ctl} = \alpha + \beta_a * ChangeALT_{ct} + \beta_b * ChangeALT_{ct} * loss_l + \rho * Controls_{ct} + \zeta * Controls_{ct} * loss_l + \sigma * FE_{cl} + \delta * FE_{tl} + \epsilon_{ctl}$, and (3)-(4): $M\&A_{ctl} = \alpha + \beta_b * ChangeALT_{ct} * loss_l + \rho * Controls_{ct} * loss_l + \sigma * FE_{cl} + \delta * FE_{tl} + \gamma * FE_{ct} + \epsilon_{ctl}$, where c stands for country, l stands for target type (loss or non-loss), and t for year. Non-interacted terms are only omitted due to collinearity with fixed effects. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level.

Table 7: Loss transfer and number of M&A, alternative loss proxies

Panel A: Large versus small losses				
Outcome	*Volume of M&A Deals (log)*			
Sample	*Targets with Large Losses*		*Targets with Small Losses*	
	(1)	(2)	(3)	(4)
Change ALT	-0.2744***		-0.0132	
	(0.0597)		(0.1278)	
Tightening ALT		-0.3023**		0.2000
		(0.1272)		(0.1424)
Loosening ALT		0.2613***		0.0874
		(0.0686)		(0.1555)
Observations	704	704	691	691
Adjusted R-squared	0.9158	0.9156	0.9314	0.9314
Country-Cohort FE	Yes	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Panel B: Alternative loss proxy: four-year net loss				
Outcome	*Volume of M&A Deals (log)*			
Sample	*4-year Loss Targets*		*Non 4-year Loss Targets*	
	(1)	(2)	(3)	(4)
ChangeALT	-0.4710***		-0.0957	
	(0.1182)		(0.0995)	
Tightening ALT		-0.6875***		-0.1168
		(0.1783)		(0.2995)
Loosening ALT		0.3560***		0.0863
		(0.1181)		(0.0732)
Observations	636	636	734	734
Adjusted R-squared	0.9229	0.9229	0.9685	0.9684
Country-Cohort FE	Yes	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes

Notes: The table shows stacked difference-in-differences regressions of change in anti-loss trafficking rules on the logarithm of number of M&A. Panel A Column 1-2 (3-4) includes targets with large (small) losses based on splitting one year losses (our main loss indicator) at the median. Panel B Column 1-2 (3-4) includes targets with (without) pre-deal losses based on net profits and losses over four years. The analysis is conducted at the country-target type (loss or non-loss) level. Specification: $M\&A_{ctl} = \alpha + \beta_j * ChangeALT_{ct} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl}$, where c stands for country, l for target loss type, and t for year. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level

Table 8: Country Case on US acquirers: Loss transfer and acquirer LCF amount

Panel A: Descriptive statistics				
	Obs	Mean	Std Dev	Median
Acquirer Tax LCF	9,316	0.512	1.769	0.055
Acquisition	9,316	0.118	0.322	0.000
ALT acquisition	9,316	0.104	0.306	0.000
Loss target	9,316	0.019	0.136	0.000
Acquirer total assets (m USD)	9,316	6,799	26,529	1,174
Acquirer tax LCF to market cap	9,315	0.286	1.455	0.033
Acquirer Control Variables				
Previous 3 years acquisitions	9,316	0.092	0.560	0.046
Retained earnings	9,316	0.666	0.472	1.000
Tax paid	9,316	0.912	0.283	1.000
Foreign activity	9,316	0.992	0.088	1.000
Market-to-book	9,316	2.372	5.085	1.680
R&D intensity	9,316	0.489	24.239	0.021
Size	9,316	6.943	1.968	6.976
Leverage	9,316	0.257	1.062	0.193

Panel B: Regression results: US acquirer's tax LCF to total assets		
Outcome	*Acquirer Tax LCF*	*Acquirer Tax LCF*
	(1)	(2)
Acquisition	0.0406	0.0323
	(0.0413)	(0.0408)
ALT Acquisition	-0.0773**	-0.0694
	(0.0363)	(0.0420)
Loss Target		0.3215**
		(0.1511)
ALT Acquisition × Loss Target		-0.3190**
		(0.1575)
Observations	9,316	9,316
Adjusted R-squared	0.7774	0.7773
Year-Industry & Acquirer Firm FE	Yes	Yes
Controls	Yes	Yes

Notes: The table shows the descriptive statistics (Panel A) and regression analysis results (Panel B) for the case study on US acquirers' loss carry forward changes around target acquisitions in anti-loss trafficking rule-(non)treated countries. The sample is restricted to US acquirers with European targets. Acquirer tax LCF is the acquirer's LCF scaled by total assets. *Acquisiton* is a dummy equal to 1 if an aquisition occurs in one of our sample countries. $ALTAcquisiton$ is a dummy equal to 1 if the target country employs anti-loss trafficking rules and zero otherwise. $LossTarget$ is a dummy equal to 1 if the target reports an accounting loss in the year before the deal and 0 otherwise. Acquirer controls are listed in Panel A, all lagged. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at industry level.

Table 9: Country Case on Norwegian M&A: Loss transfer and M&A probability

Panel A: Descriptive statistics				
	Obs	Mean	Std Dev	Median
Dummy Acquired	221,139	0.0043	0.0655	0.0000
Tax LCF Target	221,139	0.3107	0.4628	0.0000
Size	221,139	7.9200	1.6680	7.8300
Leverage	221,139	0.2239	0.2880	0.0726
ROA	221,139	0.0592	0.2561	0.0620
Sales growth	221,139	0.4355	2.3537	0.0306
Intangible intensity	221,139	0.0217	0.0634	0.0000
Cash ETR	221,139	0.1884	0.1313	0.2800
Panel B: Regression results: probability of acquisition				
Outcome	*Dummy Acquired*			
	(1)		(2)	
Tax LCF Target	-0.0040***		-0.0004	
	(0.0014)		(0.0004)	
Post × Tax LCF Target	-0.0013*		-0.0015***	
	(0.0007)		(0.0005)	
Observations	221,139		344,068	
R-squared	0.0049		0.002	
Industry & Year FE	Yes		Yes	
Controls	Yes		No	

Notes: The table shows the descriptive statistics (Panel A) and regression analysis results (Panel B) for the case study in Norway. Panel B shows th impact of the anti-loss trafficking rule in Norway on M&A. $DummyAcquired$ is a dummy variable indicating whether the firm i is targeted in year t. $TaxLCFTarget$ is a dummy variable equal to one if a target has a tax LCF in $t-1$. $Post$ is a dummy variable equal to one for the years from 2004 onwards. Column 1 displays the results with controls and column 2 without controls. Controls includes $Size$, $Leverage$, ROA, $SalesGrowth$, $IntangibleIntensity$ and $CashETR$, all lagged. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at firm level.

Table 10: Loss transfer and young firm exit and entry

Outcome	*Survival Rate*		*Birth Rate*	
	(1)	(2)	(3)	(4)
Change ALT	-0.0406***		-0.00245	
	(0.00460)		(0.00258)	
Tightening ALT		-0.0271***		0.0294***
		(0.00922)		(0.00495)
Loosening ALT		0.0439***		0.0114***
		(0.00529)		(0.00254)
Lagged GDP growth	0.00194***	0.00193***	0.000819***	0.000797***
	(0.000475)	(0.000475)	(8.80e-05)	(8.75e-05)
Lagged GDP (log)	0.257***	0.259***	-0.0305***	-0.0226***
	(0.0190)	(0.0190)	(0.00868)	(0.00868)
Audit quality	0.0268***	0.0279***	-0.0100***	-0.00805***
	(0.00355)	(0.00361)	(0.00145)	(0.00136)
Service sector growth	-0.00169***	-0.00158***	-0.000177	6.31e-05
	(0.000500)	(0.000509)	(0.000184)	(0.000183)
Population (log)	-0.172***	-0.162***	0.0564***	0.0843***
	(0.0524)	(0.0532)	(0.0210)	(0.0211)
Lagged inflation	-0.00657***	-0.00654***	0.000673***	0.000760***
	(0.000691)	(0.000690)	(0.000256)	(0.000255)
Trade (log)	0.0274	0.0278	0.0145**	0.0162**
	(0.0178)	(0.0178)	(0.00701)	(0.00702)
CIT	-0.00157***	-0.00156***	8.13e-05	5.04e-05
	(0.000414)	(0.000414)	(0.000199)	(0.000198)
LCF	-0.0255***	-0.0250***	0.00742***	0.00842***
	(0.00340)	(0.00340)	(0.00172)	(0.00170)
LCB	-	-	-	-
Observations	24,907	24,907	24,966	24,966
Adjusted R-squared	0.608	0.608	0.705	0.707
Country-Industry-Cohort FE	Yes	Yes	Yes	Yes
Industry-Year-Cohort FE	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on survival rate (columns (1)-(2)) and birth rate (columns (3)-(4)). Survival rate is the rate of survival of four year old entrants. Birth rate is the number of births as a percentage of the population of active enterprise. Specification: $Outcome_{ict} = \alpha + \beta_1 * ChangeALT_{ct} + \rho * Controls_{ct} + \sigma * FE_{ic} + \delta * FE_{iT} + \epsilon_{ict}$, where i stands for industry, c for country and t for year. The analysis is conducted at country-industry level. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-industry-cohort level.

Table 11: Loss transfer and industry performance, by high and low R&D industries

Outcome	*Industry Productivity*					
Sample	*Full Sample*		*High R&D*		*Low R&D*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.0069***		-0.0190***		-0.0064***	
	(0.002)		(0.005)		(0.002)	
Tightening ALT		-0.0174***		-0.0358***		-0.0192***
		(0.004)		(0.012)		(0.004)
Loosening ALT		0.0056***		0.0166***		0.0046**
		(0.002)		(0.005)		(0.002)
Total assets (log)	-0.0237***	-0.0237***	-0.0208**	-0.0205**	-0.0209***	-0.0209***
	(0.004)	(0.004)	(0.009)	(0.009)	(0.005)	(0.005)
Fixed assets (log)	-0.0188***	-0.0189***	-0.0173**	-0.0174**	-0.0215***	-0.0215***
	(0.004)	(0.004)	(0.008)	(0.008)	(0.004)	(0.004)
Cash (log)	0.0385***	0.0385***	0.0374***	0.0374***	0.0419***	0.0420***
	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)	(0.002)
Escape clause	0.0356***	0.0458***	0.0420**	0.0582***	0.0417***	0.0541***
	(0.005)	(0.006)	(0.018)	(0.020)	(0.005)	(0.006)
Lagged GDP growth	0.0024***	0.0024***	0.0016***	0.0016***	0.0025***	0.0025***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lagged GDP (log)	0.0456***	0.0451***	0.0368**	0.0358**	0.0400***	0.0395***
	(0.006)	(0.006)	(0.014)	(0.014)	(0.006)	(0.006)
Audit quality	-0.0036***	-0.0037***	0.0020	0.0019	-0.0042***	-0.0043***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Service sector growth	0.0027***	0.0027***	0.0012***	0.0012**	0.0029***	0.0028***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Population (log)	-0.0086	-0.0109	0.1074**	0.1016*	0.0173	0.0146
	(0.021)	(0.021)	(0.054)	(0.054)	(0.023)	(0.023)
Lagged Inflation	0.0017***	0.0018***	0.0027***	0.0028***	0.0017***	0.0018***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trade (log)	0.0721***	0.0732***	0.1031***	0.1055***	0.0738***	0.0752***
	(0.005)	(0.006)	(0.014)	(0.015)	(0.006)	(0.006)
EU Membership	0.0172***	0.0167***	0.0346***	0.0337***	0.0151***	0.0145***
	(0.004)	(0.004)	(0.010)	(0.010)	(0.005)	(0.005)
CIT	-0.0007***	-0.0007***	-0.0019***	-0.0019***	-0.0007***	-0.0008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LCF	-0.0040***	-0.0043***	-0.0019	-0.0025	-0.0044***	-0.0048***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
LCB	-0.0020	-0.0020	0.0585***	0.0585***	-0.0063	-0.0063
	(0.006)	(0.006)	(0.020)	(0.020)	(0.006)	(0.006)
Observations	51,222	51,222	6,762	6,762	41,522	41,522
Adjusted R^2	0.729	0.729	0.779	0.779	0.724	0.724
Year-Ind.-Cohort & Country-Ind.-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on industry productivity. Industry productivity is defined as the sales-weighted average ROA across all firms in a country-industry cluster. In column (2) and (3) only high R&D intensive industries are considered, while in column (4) and (5) only low R&D intensive industries are considered. Industry classification between high versus low R&D is based on NACE2 codes. All variables are defined in Appendix A. The analysis is conducted at country-industry level. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-industry-cohort level.

Table 12: Loss transfer and industry productivity (triple DiD)

Outcome	*Industry Productivity*	
	(1)	(2)
Change ALT × R&D Intensive	-0.0130***	
	(0.005)	
Tightening ALT × R&D Intensive		-0.0194
		(0.012)
Loosening ALT × R&D Intensive		0.0121**
		(0.005)
Observations	48,212	48,212
Adjusted R-squared	0.751	0.751
Year-Industry-Cohort FE	Yes	Yes
Country-Industry-Cohort FE	Yes	Yes
Year-Country-Cohort FE	Yes	Yes
Controls	Yes	Yes

Notes: The table shows the results for the stacked triple difference-in-differences regressions of change in anti-loss trafficking rules on industry productivity building on the difference-in-differences analysis in table 11. Industry productivity is defined as the sales-weighted average ROA across all firms in a country-industry cluster. The regression is run on the full sample from table 11 columns (1)-(2), where all right-hand side variables and fixed effects are interacted with the dummy *R&Dintensive* indicating whether or not an industry is classified as R&D intensive. In addition, the triple DiD allows year-country-cohort FE. All variables are defined in Appendix A. The analysis is conducted at country-industry level. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-industry-cohort level.

Table 13: Industry-performance mechanism: Loss transfer and deal synergies

Panel A: Descriptive statistics, stacked sample & 5-years around deal				
Variable	Obs	Mean	Std Dev	Median
Target ROA	750,101	0.077	0.281	0.088
Acquirer ROA	774,753	0.071	0.151	0.051

Panel B: Regression results: Target and acquirer deal synergies, deal level								
Outcome	*Target ROA*				*Acquirer ROA*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PostDeal	-0.0339***	-0.0345***	-0.0156***	-0.0160***	-0.0199***	-0.0201***	-0.0092***	-0.0095***
	(0.0011)	(0.0011)	(0.0010)	(0.0010)	(0.0006)	(0.0006)	(0.0005)	(0.0005)
Change ALT	-0.0073*		-0.0028		-0.0044**		-0.0052***	
	(0.0038)		(0.0033)		(0.0019)		(0.0015)	
ChangeALT × PostDeal	-0.0154***		-0.0089**		-0.0075***		-0.0052***	
	(0.0041)		(0.0038)		(0.0019)		(0.0014)	
Tightening ALT		0.0397**		0.0557***		0.0134**		0.0042
		(0.0155)		(0.0160)		(0.0068)		(0.0058)
Tigheting ALT × PostDeal		-0.0038		-0.0038		-0.0033		-0.0010
		(0.0053)		(0.0049)		(0.0027)		(0.0020)
Loosening ALT		0.0023		0.0013		0.0025		0.0021
		(0.0044)		(0.0035)		(0.0025)		(0.0018)
Loosening ALT × PostDeal		0.0271***		0.0170***		0.0106***		0.0087***
		(0.0048)		(0.0043)		(0.0024)		(0.0017)
Observations	750,101	750,101	733,875	733,875	774,753	774,753	766,408	766,408
R-squared	0.0304	0.0305	0.5863	0.5863	0.0578	0.0579	0.6696	0.6696
Industry-Year-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Cohort FE	Yes	Yes	No	No	Yes	Yes	No	No
Firm-Cohort FE	No	No	Yes	Yes	No	No	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

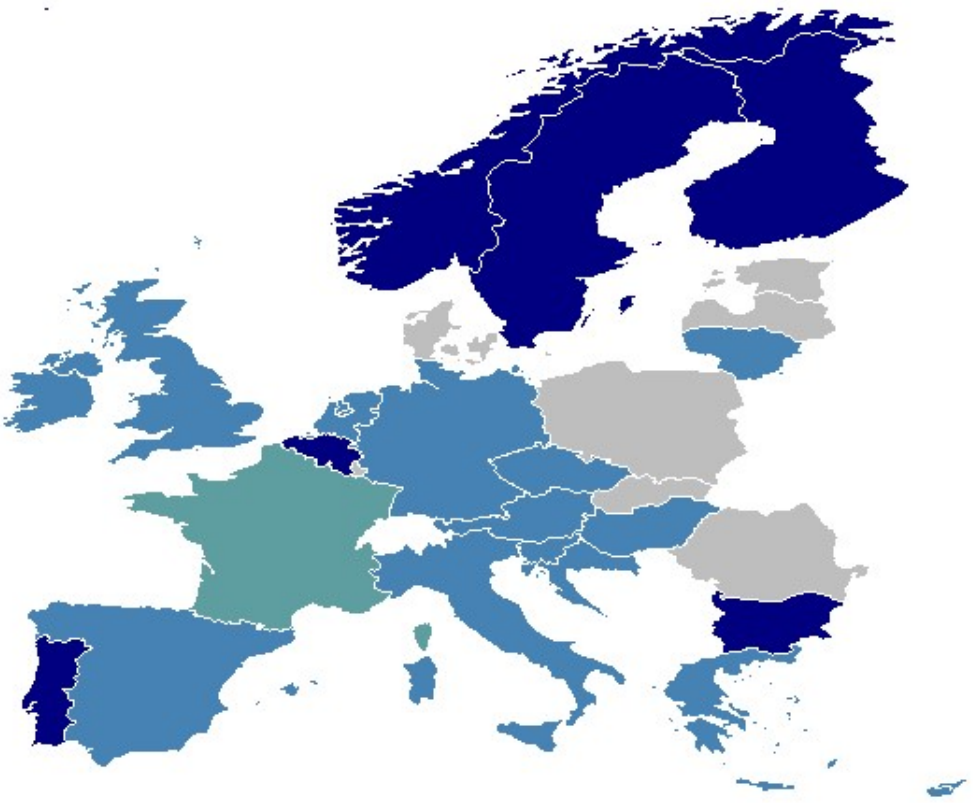
Notes: The table shows descriptive statistics (Panel A) and the results (Panel B) for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on Target and Acquirer ROA five years around the deal. The analysis is conducted at stacked-target-acquirer pair level. ROA is estimated up to five years pre- and post-deal. Fixed effects are indicated in the table. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at target-cohort-year level.

Table 14: Industry-performance mechanism: Loss transfer and risk-taking

Panel A: Industry-level analysis				
Outcome		*Industry Risk Taking*		
	(1)	(2)	(3)	(4)
Change ALT	-0.0103***		-0.0088***	-0.0095***
	(0.001)		(0.001)	(0.001)
Tightening ALT		-0.0041**		
		(0.002)		
Loosening ALT		0.0112***		
		(0.001)		
Observations	48,735	48,735	48,735	48,735
Adjusted R-squared	0.734	0.734	0.296	0.730
Industry-Year-Cohort FE	Yes	Yes	Yes	Yes
Country-Industry-Cohort FE	Yes	Yes	No	Yes
Controls	Country, Industry	Country, Industry	Country, Industry	Only Country
Panel B: Target-level analysis, sample limited to pre-deal years				
Target outcome and controls	*Obs*	*Mean*	*Std Dev*	*Median*
Target risk taking	140,788	0.081	0.134	0.042
Target ROA	140,788	0.093	0.215	0.093
Target size	140,788	15.500	1.903	15.462
Target leverage	140,788	0.128	0.224	0.025
Target cash	140,788	0.144	0.180	0.070
Outcome		*Pre-Deal Target Risk Taking*		
	(1)	(2)	(3)	(4)
Change ALT	-0.0101**		-0.0079*	
	(0.0049)		(0.0046)	
Tightening ALT		-0.0125		-0.0325**
		(0.0083)		(0.0159)
Loosening ALT		0.0101**		0.0077*
		(0.0050)		(0.0046)
Observations	140,788	140,788	192,222	192,222
R-squared	0.2518	0.2518	0.0762	0.0762
Industry-Year-Cohort FE	Yes	Yes	Yes	Yes
Country-Industry-Cohort FE	Yes	Yes	Yes	Yes
Controls	Country, Firm	Country, Firm	Only Country	Only Country

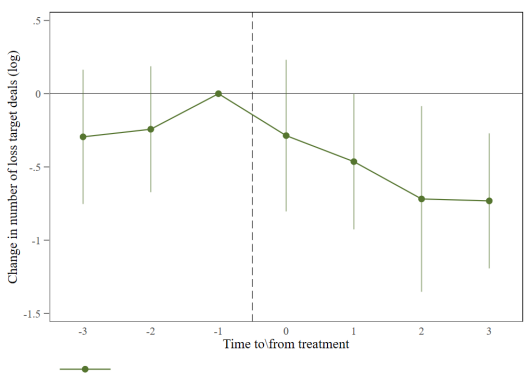
Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on risk taking. In Panel A, the analysis is conducted at country-industry-cohort level. Industry risk taking is the industry-level sales-weighted mean of the three-year ROA standard deviation. We include the controls as in Table 11. In Panel B, the analysis is conducted at target-cohort level and the sample is restricted to the five pre-deal years. Target risk taking is the three-year ROA standard deviation at firm level adjusted for mean industry risk taking. We include country and firm controls. Following Langenmayr and Lester [2018], we add additional controls for country risk factors, listed in Appendix A. All variables are defined in Appendix A. Fixed effects as indicated in the table. *, **, and *** indicate significance at the 10, 5 and 1% level. standard errors: in Panel A clustered at the country-industry-cohort level as in Table 11, in Panle B: target and country-year-cohort level.

Figure 1: Loss transfer and M&A

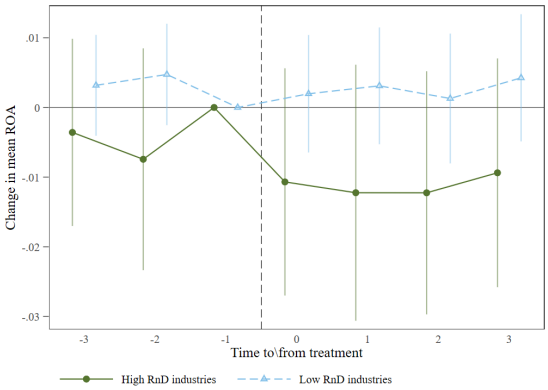


Notes: The figure displays the map of the EU27, Norway and United Kingdom and the status of anti-loss trafficking rules as of 2019. Countries with no rules are colored grey; countries which restrict the transfer of loss after a change in activity are colored green, countries which restrict the transfer of loss after a change in ownership and activity are colored dark blue, countries which restrict the transfer of loss after a change in ownership are colored light blue.

Figure 2: Descriptives on M&A and industry productivity trends in treated countries



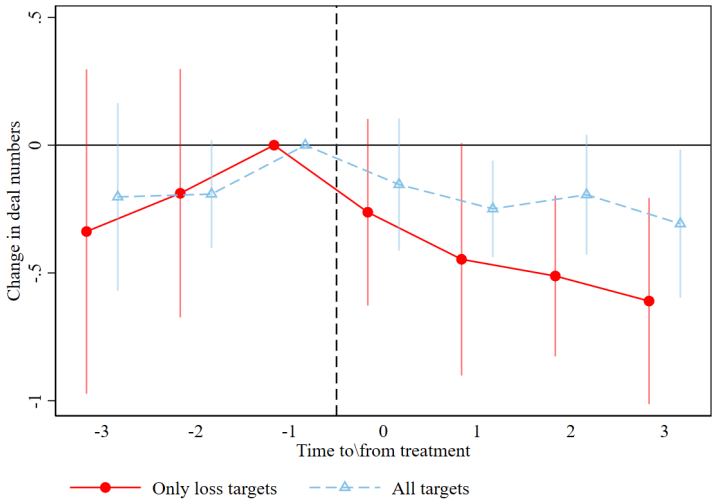
(a) Trend in number of loss target deals in treated countries (Log)



(b) Trend in ROA in treated countries by high/low R&D industries

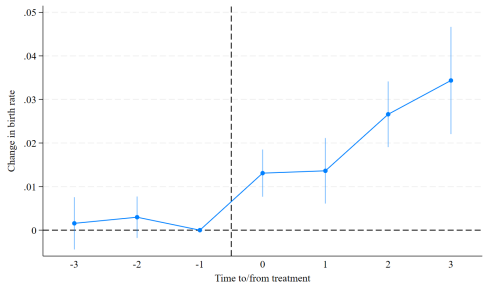
Notes: The figure plots the regression coefficients (the green and blue dots), $\beta_k s$, and 95 percent confidence intervals (the vertical lines) based on cluster robust standard errors (country-year) from the following specification: $Outcome_{(i)ct} = \alpha + \sum_{n=-4}^{4} \beta_n * ChangeALT_{cn} + \sigma * FE_c + \delta * FE_t + \epsilon_{(i)ct}$, where i denotes industry, c country and t year. The sample includes all countries which changed their anti-loss trafficking legislation. Panel A is estimated at the country-year level, and Panel B at the country-industry-year level. The outcome in Panel A is the Deal Number in loss targets, defined as the log of the number of M&A aggregated at the country level by year. Loss targets are proxied by those targets with accounting losses in the year prior to the deal. The outcome in Panel B is the sales-weighted mean ROA in an industry by year. The regression in Panel B is split into high versus low R&D industries. The treatment indicator takes value of 1 (-1) if a country tightens (loosens) anti-loss trafficking rules and the following years and zero otherwise. We include the treatment at the event time as well as four leads and four lags of the treatment indicator. The lead and lag dummies are binned at the beginning and end of the event window (after three years). Binned coefficients are not displayed. Coefficients are normalized to zero based on the level in the period preceding the treatment. Fixed effects include country and year fixed effects. Control variables are not included. All variables are defined in Appendix A.

Figure 3: Loss transfer and M&A

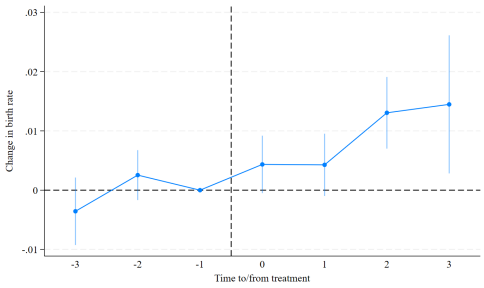


Notes: The figure plots the event study regression coefficients displaying the change in outcome relative to the control group and time t-1, $\beta_k s$, and 95 percent confidence intervals (the vertical lines) based on cluster robust standard errors from the following stacked specification: $Outcome_{ctl} = \alpha + \sum_{n=-4}^{4} \beta_n * ChangeALT_{cn} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t$, where c stands for country, l for target type (loss or non-loss), and t for year. The outcome is the volume of M&A, defined as the logarithm of the number of M&A, aggregated at the country-year-target type level. The blue line displays the test with all targets and the red line displays the test with a sample limited to loss targets. Loss targets are proxied by those targets with accounting losses in the year prior to the deal. The treatment indicator takes value of 1 (-1) if a country tightens (loosens) anti-loss trafficking rules and the following years and zero otherwise. We include the treatment at the event time as well as four leads and four lags of the treatment indicator. The lead and lag dummies are binned at the beginning and end of the event window. Binned coefficients are not displayed. Coefficients are normalized to zero based on the level in the period preceding the treatment. Fixed effects include country and year fixed effects. Control variables include lagged GDP growth, log of GDP, audit quality, value added of the services sector, the log of population, lagged inflation, the log of trade, a dummy for EU membership, corporate income tax, a dummy for the existence of a generous LCF rule, a dummy for the existence of a LCB rule. All variables are defined in Appendix A. The standard errors are clustered at country-cohort level.

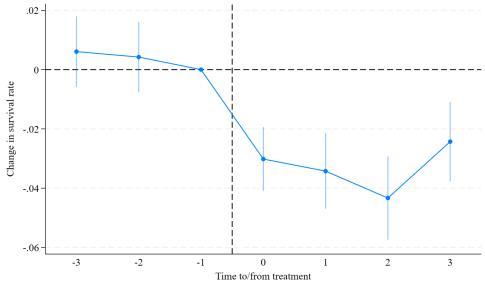
Figure 4: Loss transfer and young firm exit and entry



(a) Birth rate, tightening ALT



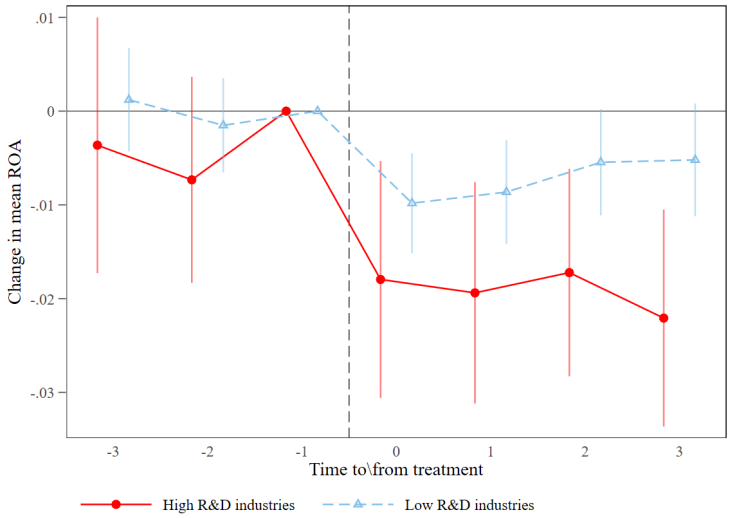
(b) Birth rate, loosening ALT



(c) Survival rate, change ALT

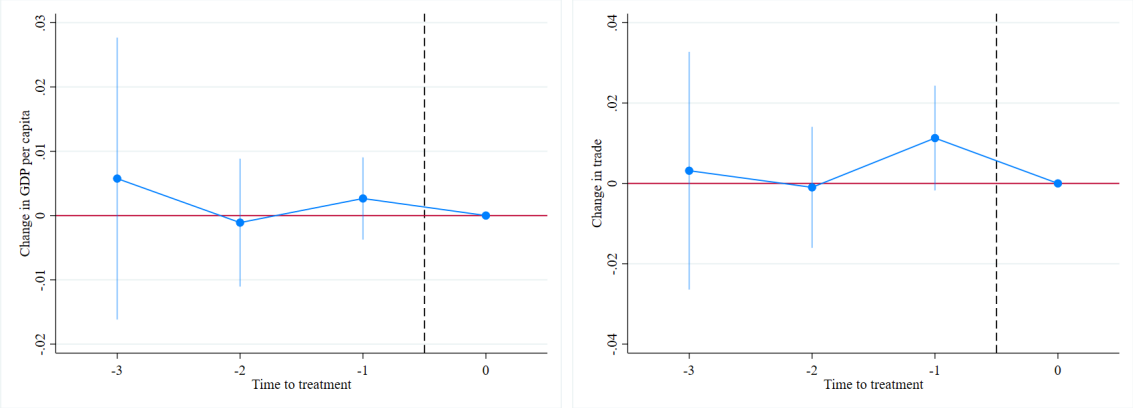
Notes: The figure plots the event study regression coefficients displaying the change in treated relative to the control group and time t-1, $\beta_k s$, and 95 percent confidence intervals (vertical lines) based on cluster robust standard errors from the following stacked and specification: $Outcome_{ict} = \alpha + \sum_{n=-4}^{4} \beta_n * ChangeALT_{cn} + \rho * Controls_{ct} + \sigma * FE_{ic} + \delta * FE_{it} + \epsilon_{ict}$, where i denotes industry, c country and t year. The outcome in Panel (a) and (b) is the birth rate, defined as the number of births to active enterprises. The outcome in Panel (c) is the survival rate, defined as the rate of survival of four-year-old entrants. Outcomes are measured at the country-industry-year level. The treatment indicator takes value of 1 (-1) if a country tightens (loosens) anti-loss trafficking rules and the following years and zero otherwise. For the birth rate, change is separated into loosening and tightening in order to account for asymmetry in treatment effects in bith rates. We include the treatment at the event time as well as four leads and four lags of the treatment indicator. The lead and lag dummies are binned at the beginning and end of the event window (after three years). Binned coefficients are not displayed. Coefficients are normalized to zero based on the level in the period preceding the treatment. Fixed effects include country-industry-cohort and year-industry-cohort fixed effects. Control variables include lagged GDP growth, log of GDP, audit quality, value added of the services sector, the log of population, lagged inflation, the log of trade, a dummy for EU membership, corporate income tax, a dummy for the existence of a generous LCF rule, a dummy for the existence of a LCB rule. All variables are defined in Appendix A. The standard errors are clustered at country-industry-cohort level.

Figure 5: Loss transfer and mean industry productivity by R&D intensity



Notes: The figure plots the event study regression coefficients displaying the change in treated relative to the control group and time t-1, $\beta_k s$, and 95 percent confidence intervals (the vertical lines) based on cluster robust standard errors from the following stacked specification: $Outcome_{ict} = \alpha + \sum_{n=-4}^{4} \beta_n * ChangeALT_{cn} + \rho * Controls_{ict} + \sigma * FE_{ic} + \delta * FE_{it} + \epsilon_{ict}$, where i denotes industry, c country and t year. The outcome is the sales-weighted mean industry ROA. The sample is split into high (red line) and low (blue line) R&D-intensive industries. The outcome is aggregated at the country-industry-year level. The treatment indicator takes value of 1 (-1) if a country tightens (loosens) anti-loss trafficking rules and zero otherwise. We include the treatment at the event time as well as four leads and four lags of the treatment indicator. The lead and lag dummies are binned at the beginning and end of the event window (after three years). Binned coefficients are not displayed. Coefficients are normalized to zero based on the level in the period preceding the treatment. Fixed effects include country-industry-cohort and year-industry-cohort fixed effects. Control variables include log of fixed assets, log of total assets, log of cash, a dummy for the existence of an escape clause, lagged GDP growth, log of GDP, audit quality, value added of the services sector, the log of population, lagged inflation, the log of trade, a dummy for EU membership, corporate income tax, a dummy for the existence of a generous LCF rule, a dummy for the existence of a LCB rule. All variables are defined in Appendix A. The standard errors are clustered at country-industry-cohort level.

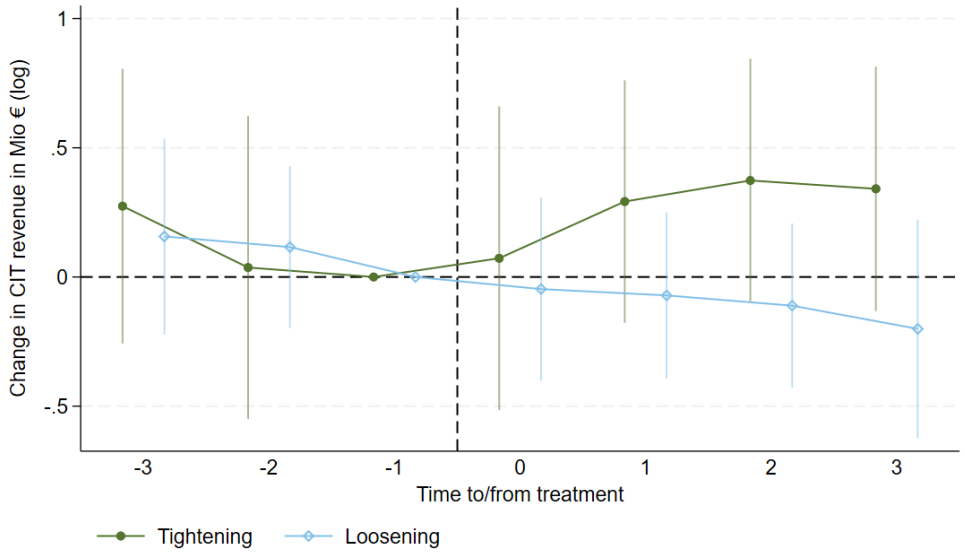
Figure 6: Test of confounding events: GDP and trade pre-trends



(a) Test of pre-trends in GDP (b) Test of pre-trends in trade

Notes: The figure plots the event study regression coefficients displaying the change in treated relative to the control group and time 0, $\beta_k s$, and 95 percent confidence intervals (the vertical lines) based on cluster robust standard errors (country) from the following stacked specification: $Outcome_{ct} = \alpha + \sum_{n=-4}^{4} \beta_n * ChangeALT_{cn} + \sigma * FE_c + \delta * FE_t + \epsilon_{ct}$, where c denotes country and t denotes year. The outcome in Panel A is the log of GDP, PPP (constant 2017 international $). The outcome in Panel B is the logarithm of sum of exports and imports (as % of GDP). Both outcomes are measured at the country-year level. The treatment indicator takes value of 1 (-1) if a country tightens (loosens) anti-loss trafficking rules and the following years and zero otherwise. We include the treatment at the event time as well as four leads and four lags of the treatment indicator. The lead and lag dummies are binned at the beginning and end of the event window (after three years). Binned coefficients are not displayed. Coefficients are normalized to zero based on the level in the period preceding the treatment. Only lead coefficients are reported, since we are interested in trends in economic outcomes pre-treatment that might confound our treatment effects. Fixed effects include country-cohort and year-cohort fixed effects. Control variables are not included. All variables are defined in Appendix A. The standard errors are clustered at country-cohort level.

Figure 7: Descriptives on Tax Revenue in Treated Countries



Notes: The figure plots the regression coefficients (the green and blue dots), $\beta_k s$, and 95 percent confidence intervals (the vertical lines) based on cluster robust standard errors (country-year) from the following specification: $TaxRev_{ct} = \alpha + \sum_{n=-4}^{4} \beta_n * ChangeALT_{cn} + \sigma * FE_c + \delta * FE_t + \epsilon_t$, where c denotes country and t year. The sample includes all countries that changed their anti-loss trafficking legislation. The outcome $TaxRev_{ct}$ is the CIT revenue, defined as the log of the amount of taxes on the income or profits of corporations including holding gains (in million €) at the country level by year. The regression is split into increases (green) and decreases in ALT rules (blue). The treatment indicator takes the value of 1 if a country changes anti-loss trafficking rules and the following years and zero otherwise. We include the treatment at the event time as well as four leads and four lags of the treatment indicator. The lead and lag dummies are binned at the beginning and end of the event window (after three years). Binned coefficients are not displayed. Coefficients are normalized to zero based on the level in the period preceding the treatment. Fixed effects include country and year fixed effects. Control variables are not included. All variables are defined in Appendix A.

Appendix

A Variable definitions

Change ALT	Change ALT increases (decreases) by 1 in the year a country tightens (loosens) anti-loss trafficking rules and in the following years. The value does not change the following years as long as the regulation stays in place. Source: hand-collected.
Tightening ALT	Tightening ALT takes a value of 1 in the year a country tightens anti-loss trafficking rules and in the following years. Source: hand-collected.
Loosening ALT	Loosening ALT takes the value of 1 in the year a country loosens anti-loss trafficking
Loss target	An indicator for targets with an accounting loss in the year prior to the deal. Source: BVD's Zephyr & BVD's Orbis.
4-year loss target	An indicator for targets with a net accounting loss over the four years prior to the deal. Source: BVD's Zephyr & BVD's Orbis.
Deal number	The logarithm of the number of M&A aggregated at country level by year. Source: BVD's Zephyr.
M&A to active enterprises	The logarithm of the number of M&A aggregated at country level by year and scaled by total number of active enterprises. Source: BVD's Zephyr. Source: BVD's Zephyr & BVD's Orbis.
Birth rate	The number of enterprise births as a percentage of the population of active enterprises measured in t+1. According to Eurostat, a birth occurs only if an enterprise starts operations from scratch. This excludes births due to mergers, break-ups, split-off or restructuring of a set of enterprises and entries resulting from a change in activity. Source: Eurostat - Business Demography.

Survival rate	The survival rate of entrants by industry where we consider as entrant, firms of four years of age and take the ratio of surviving entrants to all entrants of that age group. According to Eurostat, survival occurs if an enterprise is active in terms of employment and/or turnover. Two types of survival can be distinguished: 1. An enterprise born in year xx is considered to have survived in year xx+1 if it is active in terms of turnover and/or employment in any part of year xx+1 (= survival without changes). 2. An enterprise is also considered to have survived if the linked legal unit(s) have ceased to be active, but their activity has been taken over by a new legal unit set up specifically to take over the factors of production of that enterprise (= survival by takeover). Deaths do not include exits from the population due to mergers, takeovers, break-ups or restructuring of a set of enterprises nor from a change of activity. An enterprise is included in the count of deaths only if it is not reactivated within two years. Source: Eurostat - Business Demography.
Productivity	Sales-weighted industry average of return on assets (earnings before interest and taxes over total assets) across firms in the same industry-country-year cluster. Averages based on less than 50 firms are disregarded. Source: BVD's Orbis.
Lagged GDP growth	The lagged annual GDP growth in %. Source: World Bank - World Development Indicators.
Lagged GDP, log	The log of lagged GDP, PPP (constant 2017 international $). Source: World Bank - World Development Indicators.
Audit quality	Strength of auditing and reporting standards index (1-7, best). Source: World Economic Forum - Global Competitiveness Report.
Service sector growth	The annual growth rate of value added of the services sector in percentage of GDP. Source: World Bank - World Development Indicators.
Population, log	The log of total population in thousands. Source: United Nations.
Lagged inflation	Lagged inflation. Source: World Bank - World Development Indicators.
Trade, log	Lagged logarithm of sum of exports and imports (as % of GDP). Source: World Bank - World Development Indicators.

EU membership	An indicator for country EU Membership. Source: European Commission.
CIT	The statutory corporate income tax rate. Source: European Commission.
LCF	An indicator equal to one for a loss carry-forward available for more than five years in a country and 0 otherwise. Source: hand-collected.
LCB	An indicator equal to one for a loss carry-back available in a country and 0 otherwise. Source: hand-collected.
Escape clause	An indicator for anti-loss trafficking rules that offer an escape clause. Source: hand-collected.
Fixed assets, log	The log of the industry-country sum of fixed assets in €. Source: BVD's Orbis.
Total assets, log	The log of the industry-country sum of total assets in €. Source: BVD's Orbis.
Cash assets, log	The log of the industry-country sum of cash assets in €. Source: BVD's Orbis.

US Acquirer Analysis

Acquirer tax LCF	Loss carry forward (TLCF) scaled by total assets (AT). Source: Compustat.
ATL Acquisition	An indicator set to one if there is a deal reported in Zephyr in a target country treated by an anti-tax loss trafficking rule in a given year and zero otherwise. Source: BvD's Zephyr.
Acquisition	An indicator set to one if there is a deal reported in Zephyr in a target country in a given year and zero otherwise. Source: BvD's Zephyr.
Prev. 3-yrs acquisitions	The three year sum of cash acquisitions (ACQ) divided by ending assets (AT). Source: Compustat.
Retained earnings	An indicator set to one if retained earnings (RE) is larger than zero and set to zero otherwise. Source: Compustat.
Tax paid	An indicator set to one if cash taxes paid (TXPD) is larger than zero and set to zero otherwise. Source: Compustat.
Foreign activity	An indicator set to one if the firm reports nonzero pretax foreign income (PIFO) or foreign taxes (TXDFO or TXFO) and set to zero otherwise. Source: Compustat.
Market to book	Total assets (AT) minus common equity (CEQ) plus the market value of equity (PRCC_F * CSHO) all scaled by total assets (AT). Source: Compustat.

R&D intensity	Research and development expense (XRD) scaled by sales (SALE). Set to zero if XRD is missing. Source: Compustat.
Size	The natural log of total assets (AT). Source: Compustat.
Leverage	Leverage equals total long-term debt (DLTT+DLC) divided by total assets (AT). Source: Compustat.

Norway M&A Deal Analysis

Dummy acquired	An indicator equal to one if the firm is targeted in year t, and zero otherwise. Source: Norwegian registry data.
Tax LCF target	An indicator equal to one if a target has an LCF in $t-1$, as reported in the tax return, and zero otherwise. Source: Norwegian registry data.
Size	The natural log of total assets. Source: Source: Norwegian registry data.
Leverage	Long-term debt over total assets. Source: Norwegian registry data.
ROA	Net income over total assets. Source: Norwegian registry data.
Sales growth	The difference between sales in $t-1$ minus $t-2$ over sales in t--2. Source: Norwegian registry data.
Intangible intensity	Intangible assets over total assets. Source: Norwegian registry data.
Cash ETR	Total tax paid over taxable income as reported in the tax return. Source: Norwegian registry data.

Risk Taking Analysis

Risk taking, industry-level	Sales-weighted industry average of the earnings volatility, where the earnings volatility is the three-year standard deviation of earnings before interest, taxes, depreciation, and amortization over total assets. In year t, the standard deviation is taken over periods t to t+2. Source: BVD's Orbis.
Target risk taking (pre-deal)	Targets pre-deal earnings volatility, where the earnings volatility is the three-year standard deviation of earnings before interest, taxes, depreciation, and amortization over total assets. In year t, the standard deviation is taken over periods t to t+2. Years after the deal are not included. The target volatility is adjusted by its industry mean following Langenmayr and Lester [2018]. Source: BVD's Orbis & Zephyr.

Target ROA	Earnings before interest, taxes, depreciation, and amortization over total assets. Source: BVD's Orbis & Zephyr.
Target size	Logged total assets. Source: BVD's Orbis & Zephyr.
Target leverage	Non-current, longterm liabilities over total assets. Source: BVD's Orbis & Zephyr.
Target cash	Cash assets over total assets. Source: BVD's Orbis & Zephyr.
Additional country risk controls following Langenmayr and Lester [2018]:	
Risk-free rate	Interest rate on government bonds maturing in ten years. Source: OECD.
Regulatory quality	Value of the regulatory quality indicator as percentile rank. Source: World Bank - World Governance Indicators.
Rule of law	Value of the rule of law indicator as percentile rank. Source: World Bank - World Governance Indicators.
Control of corruption	Value of the control of corruption indicator as percentile rank. Source: World Bank - World Governance Indicators.
Synergy Analysis	
Target ROA	The target's return on assets (earnings before interest, taxes, depreciation, and amortization over total assets). To measure deal synergies, the sample is limited to five years around deal occurrence. Source: BVD's Orbis & Zephyr.
Acquirer ROA	The acquirer's return on assets (earnings before interest, taxes, depreciation, and amortization over total assets). To measure the deal synergies, the sample is limited to five years around the deal occurrence. Source: BVD's Orbis & Zephyr.
Post deal	Is an indicator set to one in the years after acquisition, and zero in the years before. Source: BVD's Zephyr.

B Further institutional details

The offset of losses for tax purposes is subject to several restrictions. Intra-periodic offset can be restricted to the same source of income that generated the losses (so-called horizontal loss offset). This is often the case for capital losses. Business losses can usually also be offset against profits from other sources (so-called vertical loss offset). If losses cannot be offset in the same period, they have to be carried over to other periods in the past (LCBs) or future (LCFs). These tax loss assets carry value (assuming the company becomes profitable or used to generate profits in the past) as they embody potential tax savings (Amir and Sougiannis [1999]). The value of these tax assets depends on the expected time needed to offset them against positive income. Longer time horizons embody higher risk and lower present values of current losses. Inter-periodic loss offset is also subject to several restrictions.

First, temporal and/or absolute restrictions limit the amount of losses that can be offset in a given year. All countries that allow for a LCB limit the amount of years a loss can be carried back to. The variation in temporal restrictions for LCFs ranges from five years to no time limit. Absolute restrictions are usually expressed in a specified percentage above an allowance. As a result, companies with large LCFs cannot reduce their full taxable income and are obliged to pay taxes on the residual (so-called minimum taxation).

Second, events such as a change in ownership or activity trigger anti-loss trafficking rules which can lead to the forfeiture of accumulated tax LCFs. Absent tax loss transfer limitations, unprofitable corporations with high LCFs can be acquired and merged with profitable firms to set off the otherwise worthless losses. The restrictions aim to prevent loss trafficking; in other words, the acquisition of shell companies with significant LCFs but which lack any other economic rationale. Legislators deem these transactions abusive as the sole purpose is the transfer of the tax assets. Abuse is assumed based on codified criteria, and the taxpayer bears the burden of proof to show otherwise.

If anti-loss trafficking rules are triggered, accumulated LCFs are forfeited altogether. They can neither be offset against profits of the target nor the acquiring entity. Thus, the tax assets are not usable even if the target eventually turns profitable again after an acquisition, rendering the LCFs worthless.

The provisions commonly refer to a significant change in ownership and/or a change in activity as triggering criteria. What constitutes such a significant change differs depending on the national legislation. In general, a change in ownership is considered harmful when the controlling majority of the corporation carrying the losses changes. The aim is to limit the benefits of LCFs to the shareholders that bore them. Changes in activity are often evaluated based on changes in assets, turnover, or targeted customer markets. The legislator ties the use of losses to profits generated by the activity that caused them in the first place. There are different types of anti-loss trafficking rules. Cumulative regulations require a change in ownership and connected change in activity. If there is either only a change in ownership or only a change in activity, this type of restriction is not triggered. Alternatively, rules can mandate the forfeiture of losses after a change in activity independent of any changes at the

ownership level. A third type of anti-abuse regulation relies solely on a change in ownership. Fourth, countries that relate their loss transfer restrictions to either a change in ownership or a change in activity pose the most restrictive rules, as the fulfillment of either criterion is sufficient.

In some cases, exemptions from the regulations are allowed through "escape clauses". Depending on the national legislation, anti-loss trafficking rules may not apply if the transaction is aimed to help the company recover (i.e., for job preservation), if it is listed, if it is an internal acquisition within a group and ultimate ownership does not change, if it holds hidden reserves exceeding the value of loss carry-forwards, or if economic reasons are demonstrated refuting the abuse assumption. The specific rules (see Table 15) and their application in practice differ across countries. Anecdotal evidence suggests that some countries appear more lenient[49], while others have strict evaluations on a case-by-case basis[50].

Court cases indicate that arguments buyers brought forward to economically justify transactions are not necessarily accepted by tax authorities or judges. E.g., in the case of Armada (see below, section C) the Norwegian Supreme Court deemed the offset of accumulated losses to be the predominant motive for the acquisition of the company, disallowing the transfer of LCF after the transfer in ownership. To the best of our knowledge, there are no official statistics on the claim of exemptions in loss transfer cases in any of the countries in our sample.

Many countries have general anti-avoidance rules (GAARs) that permit tax authorities to disallow transactions aimed primarily at avoiding, deferring, or reducing taxes (see Table 16). While GAARs target tax abuse broadly, they are subject to judicial interpretation and often insufficient to address loss trafficking specifically. As a result, many jurisdictions implement anti-loss trafficking rules, which are tailored to restrict the utilization of LCFs after changes in ownership. Germany's experience highlights the limitations of relying solely on GAARs. In the late 1980s, the Federal Financial Court moved away from its earlier GAAR case law, which had required both civil and economic identity between the loss-incurring and the loss-claiming party. This judicial shift opened the door to tax-motivated acquisitions of loss-making firms, effectively enabling loss trafficking.[51] In response, Germany introduced a specific anti-loss trafficking rule in 1990 to curb such practices, recognizing the need for codified provisions rather than reliance on broad, interpretation-dependent GAARs.

[49]E.g., in Finland: Nuotio, V. (2013). Income taxation and loss equalization, see here FinnishRule (in Finnish).

[50]E.g., in Portugal: KPMG (2021). Portugal - Taxation of cross-border mergers and acquisitions, see page 447 here PortugalRule

[51]See, e.g., Federal Financial Court decision IV R 3/00 (1.2.2001).

Table 15: Anti-loss trafficking rules in the EU28 and Norway, 1999-2019

ISO2	Intro	Year	Regulation
AT	1988	1999-2019	Cumulative: change in ownership >75% and change in activity
			Escape: recovery, hidden reserves
BE	1997	1999-2019	Ownership: change in control
			Escape: economic reasons
BG	1998	1999-2019	Ownership: change in ownership >50%
CY		1999-2019	Cumulative: change in ownership >50% and change in activity
			Escape: groups
CZ		1999-2003	-
	2004	2004-2019	Cumulative: change in ownership >25% and change in activity
			(offset only against profits from similar activities)
DE	1991	1999-2007	Cumulative: change in ownership >50% and change in activity
			Escape: recovery
		2008-2009	Ownership: change in ownership >50%,
			pro-rata after change in ownership between 25%-50%
		2010-2015	Ownership: change in ownership >50%,
			pro-rata after change in ownership between 25%-50%
			Escape: recovery, hidden reserves, groups
		2016-2019	Cumulative: change in ownership >50% and change in activity
			Escape: recovery, hidden reserves, groups
DK	1988	1999-2019	(regulations only apply to capital losses)
EE		1999-2019	Distribution tax, no LCF available
ES	1996	1999-2014	Ownership: change in majority
			Escape: group
		2015-2019	Cumulative: change in majority and change in activity
			Escape: group
FI	1993	1999-2012	Ownership: change in ownership >50%
			Escape: recovery, economic reasons
		2013-2019	Ownership: change in ownership >50%
			Escape: recovery, economic reasons, quoted, group
FR	1985	1999-2011	Activity: change of activity
			Escape: hidden reserves
		2012-2019	Activity: change of activity
			Escape: hidden reserves, recovery
GB	1988	1999-2019	Cumulative: change of ownership >50% and change in activity
			Escape: group

Continued on next page

Table 15: Anti-loss trafficking rules in the EU28 and Norway, 1998-2019 - continued

ISO2	Intro	Year	Regulation
GR		1999-2013	-
	2014	2014-2017	Ownership: change in ownership >33% *Escape*: economic reason
		2018-2019	Cumulative: change in ownership >33% and change in activity *Escape*: economic reason
HU	1997	1999-2000	Ownership: change in ownership >50%
		2001-2011	-
	2012	2012-2019	Cumulative: change in majority and change in activity *Escape*: quoted, group
HR		1999-2009	-
	2010	2010-2019	Cumulative: change in ownership >50% and change in activity *Escape*: recovery
IE	1976	1999-2019	Cumulative: change in ownership >50% and change in activity *Escape*: group
IT	1998	1999-2019	Cumulative: change in majority and change in activity *Escape*: group
LT		1999-2001	-
	2002	2002-2019	Cumulative: change in ownership >66% (from 2007: control) and change in activity
LU		1999-2019	-
LV	1995	1999	Ownership: Change in ownership >50% *Escape*: group
		2000-2017	Cumulative: Change in control and change in activity *Escape*: group
		2018-2019	Distribution tax, no LCF available
MT		1999-2019	-
NL	1970	1999-2000	Ownership: Change in ownership >30% *Escape*: group, hidden reserves
		2001-2019	Cumulative: Change in ownership >30% and change in activity *Escape*: group, hidden reserves, quoted
PL		1999-2019	-
PT	1995	1999-2005	Activity: change in activity *Escape*: economic reasons
		2006-2013	Ownership/activity: change in ownership >50% or change in activity *Escape*: economic reasons
		2014-2019	Ownership: change in ownership >50% *Escape*: economic reasons, group
RO		1999-2019	-

Continued on next page

Table 15: Anti-loss trafficking rules in the EU28 and Norway, 1998-2019 - continued

ISO2	Intro	Year	Regulation
SE	1983	1999-2019	Ownership: change in control
			Escape: economic reasons, group, hidden reserve
SI		1999-2004	-
	2005	2005-2006	Ownership: change in ownership >25%
		2007-2019	Cumulative: change in ownership >50% and change in activity
			Escape: recovery
SK		1999-2019	-
NO		1999-2003	-
	2004	2004-2019	Ownership: change in control
			Escape: economic reasons, group

Notes: Treatment of tax losses after an acquisition. Retro-actively applicable rules are disregarded. Ownership-based are more restrictive than activity-based regulations. Cumulative rules are the least restrictive type of anti-loss trafficking rules. *Source:* Update of Bührle and Spengel [2020].

Table 16: General anti-abuse regulations in Europe

Country	ISO2	Original	Strengthening	ALT rule before 1998
Austria	AT	1962	2019	yes
Belgium	BE	1992	2013	yes
Bulgaria	BG	2007		yes
Cyprus	CY	1979	2019	yes
Czech Republic	CZ	1993	2006, 2019	from 2004
Germany	DE	1919	2008	yes
Denmark	DK	2015	2019	no
Estonia	EE	2002		no
Spain	ES	1963	2003	yes
Finland	FI	1943	2016	yes
France	FR	1941	2009, 2019	yes
United Kingdom	GB	2013		yes
Greece	GR	2014		from 2014
Croatia	HR	2001	2018	from 2010
Hungary	HU	1996	2019	until 2000/ from 2012
Ireland	IE	1989	2014	yes
Italy	IT	1990	2015	yes
Lithuania	LT	2019		from 2002
Luxembourg	LU	1948	2016, 2019	no
Latvia	LV	2012		yes
Malta	MT	1978	2019	no
Netherlands	NL	1924	2016	yes
Norway	NO	1921	2016	from 2004
Poland	PL	2003	2016, 2019	no
Portugal	PT	1999	2019	yes
Romania	RO	2004	2018	no
Sweden	SE	1981	1995	yes
Slovenia	SI	2019		from 2005
Slovak Republic	SK	1992	2014, 2018	no

Notes: Source: Cowx and Kerr [2024], Spengel et al. [2024], own research.

C Anecdotal evidence for loss trafficking

E.g., Erickson et al. [2019] provide anecdotal evidence in their appendix that losses can be considered an important factor in acquisitions. In the following, we additionally present some cases where anti-loss trafficking rules also played an important role and illustrate that companies deemed their LCFs valuable enough to fight for them in court.

C.1 Case HR-2017-2410-A (Norway)

Armada Eiendom AS (Armada) is a limited liability company active in real estate with a focus on housing projects in Oslo. Asker Eiendom AS (Asker) was the second largest shareholder and bought the remaining shares in the company in 2007. At that point, Armada had accumulated net losses of NOK 35 million (EUR 3 million). Until Asker's offer, the shareholders planned to liquidate the company that had no employees left and no further operations scheduled. The company continued to exist only due to the developer's liability. After the acquisition, Armada bought new property which Asker already had negotiated before the deal. The LCF was set off against rental income from this purchase and group contributions. In 2012, the Norwegian tax authority decided to refuse the LCF for the years 2007 to 2011 after the acquisition, relying on the Norwegian anti-loss trafficking rule. According to this restriction, after a substantial change in ownership, the LCF is lost. Yet, an escape rule exists: the LCF can be utilized post-M&A, if the tax authority determines that the predominant motive for the change in ownership was not to exploit the tax benefit. Armada went to the Supreme Court appealing the tax authority's decision,[52] bringing forward that their main motive for the transaction was to end a co-ownership which was perceived as problematic and to free up capital tied up in Armada.

This is the first Supreme Court ruling on the interpretation of the Norwegian anti-loss trafficking rule and the application of the escape clause, which entails uncertainty due to its broadly defined nature. As argued by the Supreme Court judges, deciding whether the escape rule is granted includes both an element of objectivity (i.e., is there a tax benefit and how large it is?) but also an element of subjectivity (i.e., is the tax benefit the predominant motive for the transaction?).[53] The court deemed the tax motive to be objectively fulfilled: there was a substantial tax benefit involved in the M&A transaction which, while not explicitly valued by the buyer, had been implicitly incorporated in the acquisition price in light of the other acquired assets. The court acknowledged that also external circumstances of such transactions that are hard to judge in practice had to be considered to determine the subjective, i.e., predominant, motive. However, they found no evidence documenting the disagreement between shareholders and supporting the liquidity motive Asker claimed

[52]See Skatteetaten (13 Mar 2019), Questions about the acquisition of the tax loss position are the predominant motive behind a transaction, available here SkatteetatenQuestions (in Norwegian)

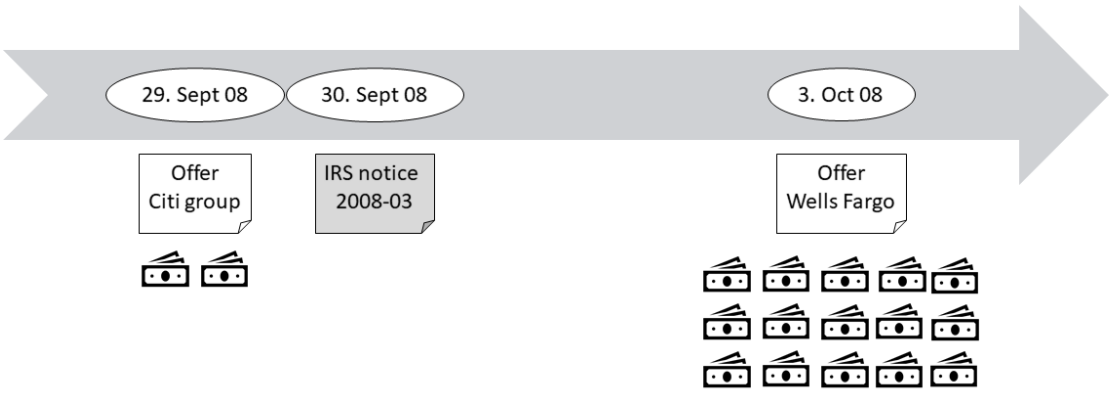
[53]For more details, see Armada Eiendom AS vs. the state, HR-2017-2410-A, (sak nr. 2017/1042), decision from 20 Dec 2017.

as the main objectives for the transaction. Ultimately, the Supreme Court deemed the use of LCF as the predominant motive for the acquisition and did not grant the escape clause. Thus, the anti-loss trafficking rule was applied and Armada's LCF was lost post-M&A.

C.2 Acquisition of Wachovia (USA)

Due to the financial crisis, the banking group Wachovia incurred substantial losses. Citigroup agreed to purchase the company for around 2 billion dollars. Just a few days later, Wells Fargo declared interest as well and offered a multiple of the amount, approximately 15 billion dollar.[54]

Figure 8: Timeline acquisition of Wachovia



Note: Timeline of the offers by Citi group and Wells Fargo for Wachovia in 2008 around the publication of IRS notice 2008-03, which allowed the transfer of $ 60 billion in losses that were sitting on Wachovia's balance sheet.

The cause for this substantial increase in perceived value of Wachovia was generally perceived to be a tax rule clarification that was issued by the US Internal Revenue Service just a day after Citigroup had announced the deal (and was revoked a few months later).[55] Based on the notice, losses and deductions attributable to loans of a bank were not subject to the Section 382 limitations after changes in ownership. Any buyer of Wachovia was thus able to utilize the accumulated losses to offset taxable income even after the acquisition.[56]

[54]See Crowell (6 Oct 2008), Tax Notice Drives Wachovia Takeover Turmoil, available here CrowellWachoviaCase.

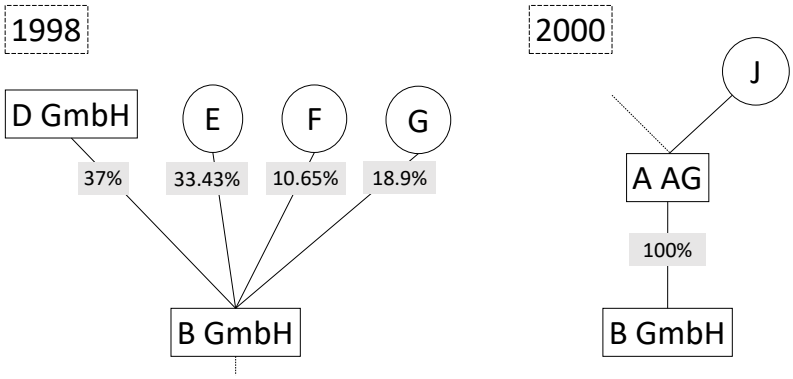
[55]See Crowell (6 Oct 2008), Tax Notice Drives Wachovia Takeover Turmoil, available here CrowellWachoviaNews.; The Paypers (06 Oct 2008), Wachovia abandons Citi for surprise Wells Fargo deal, available online at ThePayersWachoviaNews; The Street (10 Nov 2011), How Wells Fargo Won the Tax-Dodging Trophy, available here WickedlocalWachoviaNews.

[56]IRS (2008), Application of Section 382(h) to banks. Notice 2008-83, available here IRSNotice200883.

C.3 Case 3 K 65/08 (Germany)

B GmbH (B) was founded in 1991 and was conducting business as holding of the B-Group with ten to eleven employees. The B-Group traded in computer games and accessories and sometimes also manufactured them; B itself participated in some computer game trades. The firm was incurring losses from 1996 to 1998 due to partial depreciation of the holdings in its subsidiaries. At the end of 1998, business was discontinued by selling the subsidiaries to a third party and laying off all employees. B's assets were mainly consistent of liquid assets. At this point, the company had accumulated LCFs for corporate tax purposes up to around DM 35 million. In 2000, A AG (A) bought the shares in B GmbH from the previous owners. The purchase agreements included a section stating that an additional purchase price was to be paid in case the LCFs could be offset against taxable income of B earned after the acquisition. B changed its focus to the investment in high-tech start-ups, effectively changing its business activity from an executive holding of an entertainment software group to a venture capital firm, acquiring substantial shareholdings in start-ups in the "new economy". B was later merged with A in 2001.

Figure 9: Schematic representation shareholdings B GmbH



Note: Schematic representation of the shareholdings in the case 3 K 65/08 at the financial court Hamburg, judgement from 20.04.2010. The court denied the use of accumulated losses of around DM 35 Mio after the company had been sold to the A AG, having assessed the transaction as an abusive trade in losses.

The court denied the offset of B's LCFs with profits from the new business activities, stating that the plaintiff's only aim when acquiring the shares in B was to take advantage of its LCFs. This inference arises in particular from the remuneration agreed specifically for the transfer of the LCFs.The plaintiff did not intend to operate in the former business area of B, entertainment software. A acquired a company whose assets consisted almost exclusively of liquid receivables and investments, i.e., a cash box, at a price that corresponded exactly

to this value. The visible reason for the acquisition instead of liquidation of B were the use of the existing LCFs. The fact that B was merged with the plaintiff in 2000 to simplify the corporate structure also shows that B was active in the same business area as the plaintiff that B, as an independent company, was of no use to the plaintiff and that the latter was only striving to transfer the LCFs to itself.

C.4 Urban Redevelopment Corporation v. C.I.R (USA)

Urban Redevelopment Corporation (Urban) was a New York corporation established in 1949 and dealing with real and personal property. The corporation incurred substantial losses in 1950 and 1951 and was inactive during 1952. In 1953, the sole owner, Fred F. Stoneman sold the corporation to Randolph Rouse (Rouse), a Virginian land developer and builder. The place of business of Urban was consequently moved to Virginia. The stated purpose for the acquisition were plans, drawings and specifications belonging to the corporation. However, Rouse failed to obtain these items after some ineffectual efforts, refraining from taking legal action against the former director that supposedly had them in their possession. In 1954 and 1955 Urban constructed and sold residential properties in Virginia, generating substantial profits. The resulting income taxes were reduced by offsetting the previously accumulated LCFs, claiming deductions of roughly USD 46,000.

The tax court considered the avoidance of income tax Rouse's principal purpose in acquiring Urban's stock and denied the loss offset. The court found that, while Rouse had his certified public accountant thoroughly verify Urban's LCFs, he failed to check the existence of the plans he claimed seeking to acquire. Overall, the court assessed Route's stated economic reasons as "inherently improbable".

D Confounding events

Oftentimes, changes in tax loss transfer restrictions are part of bigger tax law packages than include other, potentially confounding, legislative measures. More restrictive general LCF legislation, i.e., shorter time horizons and absolute limits, decreases the value of accumulated LCFs and thus acquisition prices (e.g., Erickson et al. [2019]). Consequently, one would expect stricter temporal and absolute loss restrictions exerting an opposing effect to stricter anti-loss trafficking rules. Lower corporate taxes are associated with higher acquisition activity (e.g., Arulampalam et al. [2019],Todtenhaupt and Voget [2021]). However, in the tax loss setting higher taxes also imply higher tax savings if LCFs can be set off and thus increases in expected values of the tax assets. The direction of potentially confounding effects is unclear. Lower taxes on capital gains from the sale of shares in subsidiaries decreases the costs imposed on sellers and thus the required acquisition premium (e.g., Todtenhaupt et al. [2020]), leading to a positive effect on acquisition activity. In our empirical specification, we specifically control for the time-variant country-specific aspects by including variables for tax rates as well as LCB and LCF provisions in the estimation equation. Nevertheless, in the following we discuss concurrent changes in tax law that fall together with the changes in anti-loss trafficking rules we use for our identification.

The overview below presents and overview over relevant tax changes at the time of change in anti-loss trafficking rules. At the time of change in anti-loss trafficking rules (column ALT), we list changes in temporal and absolute restrictions of LCFs (columns LCF time and limit), statutory corporate income tax (column CIT) and capital gains taxes levied on the sales of shares of substantial holdings in non-listed subsidiaries (column Cap. Gains). For each column, changes in legislation are indicated with the status before and after the change; if there was no change the space is left blank. Around half of the changes in tax loss transfer restrictions were accompanied by additional changes in legislation in the same year.

Concurrent changes in tax law

Country	Year	ALT	LCF time	LCF limit	CIT	Cap. gains
CZ	2003	-	7		0.31	
	2004	cum	5		0.28	
DE*	2007	cum			0.25	
	2008	own			0.15	
DE	2015	own				
	2016	cum				
ES	2014	own	18		0.30	
	2015	cum	inf		0.28	
GR	2013	-			0.20	
	2014	own			0.26	
HR*	2009	-				
	2010	cum				
HU	2000	own				
	2001	-				
HU	2011	-		-		
	2012	cum		x		
LT	2001	-			0.24	
	2002	cum			0.15	
LV	1999	own				
	2000	cum				
NL	2000	own				
	2001	cum				
PT*	2005	act				
	2006	act/own				
PT	2013	act/own	5		0.25	50% exemption
	2014	own	12		0.23	full exemption
SI	2004	-				
	2005	own				
SI*	2006	own	7		0.25	no exemption
	2007	cum	inf		0.23	50% exemption
NO	2003	-				no exemption
	2004	own				full exemption

Notes: The overview shows concurrent changes in tax legislation at the time of change in anti-loss trafficking rules (ALT). Listed are changes in loss carry-forward (LCF) time and limit, statutory corporate income tax (CIT) and capital gains taxes on sales of shares of substantial holdings in non-listed subsidiaries.* dropped from main analysis due to Financial Crisis (all treatments 2 years around the cirsis year 2008), ** dropped from stacked design

due to repeated treatment in a time window <5 years. *Sources:* IBFD Country Analyses, EY Worldwide Corporate Tax Guides.

E Norwegian registry data: Cleaning steps

In this section, we provide further details on the confidential data we use for Norwegian case study and how we build the variables used in the respective regression analysis. We rely on two data sources provided by Norway Statistics, namely the tax return data as provided by Skatteetaten, i.e. Norwegian Tax Authority and the financial and corporate data as provided by Brønnøysundregistrene, i.e. the Company National Registry. Data is de-identified, i.e. we do not access the original firm names nor the Norwegian organizational numbers, but each firm have a unique numerical identifier which is the same across all data sources. This enables us to merge tax return data with the financial and corporate data. From the tax return data, we obtain information on the accumulated loss-carry forward for each Norwegian entity since 1995. From the financial and corporate data, we obtain information on firm key characteristics, foundation year and current owners.

$TaxLossCarryfoward$ and $CashETR$ are computed using variables from the tax return dataset; $Size$, $Leverage$, $SalesGrowth$, ROA, $IntangibleIntensity$ are computed using variables from the Company National Registry dataset. We do not have a variable that provides us information of a possible acquisition or merger. But we have information on each parent-subsidiary relationship, i.e. for each year since 2001, we know for each firm the respective parent company. We use the parent-subsidiary relationship dataset to establish a change in owner. We generate a variable that indicate the first year of a parent-subsidiary relationship and we consider this the deal year. We exclude cases when the first year a parent-subsidiary relationship coincides with the subsidiary foundation year. We also exclude when the first year of relationship is 2001 because this is the first year of data for the parent-subsidiary relationship dataset and thus we cannot distinguish new and existing owners.

F Additional tables and figures

F.1 Additional sample descriptives

Table 17: Full Sample Descriptives

Panel A: Country-Level Descriptives						
Variable	Obs	Mean	SD	P25	Median	P75
Number of M&A	1,448	215.423	398.335	31	90	206
Number of M&A (log)	1,448	4.338	1.539	3.434	4.5	5.328
M&A to active enterprises	1,448	0.006	0.031	0	0.001	0.003
M&A t. act. enterpr. (log)	1,448	-6.86	1.572	-8.044	-6.851	-5.919
Lagged GDP Growth	1,448	1.838	3.248	0.707	1.89	3.172
Lagged GDP (log)	1,448	27.06	1.17	26.349	26.797	28.52
Audit Quality	1,448	5.687	0.691	5.345	5.853	6.197
Service Sector Growth	1,448	65.365	5.713	62.053	65.304	69.288
Population (log)	1,448	9.37	1.342	8.605	9.207	10.986
Lagged Inflation	1,448	1.689	1.26	0.839	1.696	2.486
Trade (log)	1,448	4.528	0.545	4.113	4.392	4.754
CIT	1,448	28.041	7.235	24.5	28	33.99
LCF	1,448	0.876	0.33	1	1	1
LCB	1,448	0.304	0.46	0	0	1
EU membership	1,448	0.985	0.122	1	1	1
Panel B: Industry-Level Descriptives						
Variable	Obs	Mean	SD	P25	Median	P75
Survival rate	24,907	0.558	0.135	0.47	0.546	0.640
Birth rate	24,966	0.102	0.055	0.067	0.092	0.129
Productivity	51,222	0.086	0.059	0.051	0.078	0.111
Risk Taking	48,735	0.052	0.034	0.033	0.048	0.069
Total assets (log)	51,222	20.694	1.623	19.707	20.799	21.753
Fixed assets (log)	51,222	19.652	1.584	18.700	19.750	20.677
Cash assets (log)	51,222	18.238	1.501	17.304	18.264	19.246
Escape Clause	51,907	0.550	0.498	0	1	1

Notes: The table shows the descriptive statistics for the variables in our country and industry analyses in the stacked sample. All variable definitions, including sources are provided in Appendix A.

Table 18: Observations by treatment events

Event Type	Event Time	Treated Country	Country-Level M&A Sample	Industry-Level Productivity Sample	Industry-Level Eurostat Sample
loosening	2001	Netherlands	250	3,358	**
	2014	Portugal	252	7,383	6,505
	2015	Spain	228	6,773	5,987
	2016	Germany	204	5,820	5,393
tightening	2002	Lithuania	*	3,901	**
	2004	Norway & Czech Republic	296	5,531	**
	2005	Slovenia	*	5,105	1,386
	2012	Hungary	*	6,694	5,636
	2014	Greece	238	6,657	***

Notes: The table shows the count of observations broken out by event cohort and sample. * denotes treated countries dropped due to insufficient deal data (see sample selection steps). ** denotes years for which Eurostat data is unavailable. *** denotes countries for which Eurostat data is unavailable.

F.2 Additonal M&A results: reform type and firm level analysis

Table 19: Loss transfer and number of M&A, level dummies own/cum

Outcome	*Volume of M&A Deals (log)*		
Sample	*Full Sample*	*Loss Targets*	*Non-Loss Targets*
	(1)	(2)	(3)
Ownership-based regime	-0.2435	-0.3811*	-0.0845
	(0.1908)	(0.2194)	(0.3059)
Cumulative regime	-0.0436	-0.0850	0.0178
	(0.2105)	(0.2328)	(0.3183)
Observations	1,448	714	734
Adjusted R-squared	0.9618	0.9421	0.9688
Country-Cohort FE	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes

Notes: The table shows the results for the stacked difference-in-differences regressions of type of anti-loss trafficking rules on logarithm of number of M&A. *Ownership-based regime* is a dummy for regimes where LCFs are forfeited after substantial changes in ownership. *Cumulative regime* is a dummy for regimes where LCFs are forfeited after substantial changes in ownership in combination with changes in activity. In column (2), the sample only includes targets with pre-deal losses and in column (3), the sample excludes targets with pre-deal losses. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. Specification: $M\&A_{ctl} = \alpha + \beta_1 * Ownership\_based\_regime_{ct} + \beta_2 * Cumulative\_regime_{ct} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl}$, where c stands for country, l for target type, and t for year. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level.

Table 20: M&A deals specification, additional firm-level tests

Outcome	*Acquisition Dummy*			
Firm level loss indicator		*1-Year Loss*	*Loss to Assets*	*4-Year Net Loss*
	(1)	(2)	(3)	(4)
Change ALT	-0.0001***	-	-	-
	(0.0000)			
Change ALT × Large Loss Target		-0.0615***	-0.0535***	-0.0460***
		(0.0167)	(0.0181)	(0.0146)
Change ALT × Small Loss Target		-0.0001***	-0.0001**	-0.00006
		(0.0001)	(0.0001)	(0.00005)
Large Loss		0.1461***	0.1508***	0.1042***
		(0.0035)	(0.0036)	(0.0029)
Small Loss		-0.0003***	-0.00034***	-0.0003***
		(0.0000)	(0.0000)	(0.0000)
Observations	104,106,465	54,446,852	54,298,636	35,063,478
Adjusted R-squared	0.0006	0.0162	0.0166	0.0173
Country-Cohort FE	Yes	-	-	-
Industry-Year-Cohort FE	Yes	Yes	Yes	Yes
Country-Year-Cohort FE	No	Yes	Yes	Yes

Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on an acquisition dummy at the (target-)firm level. The sample covers firms with and without deal years based on Orbis (financials and firms without deals) and Zephyr (deal data) merged data. The specification with fixed effects following columns (2)-(4) is: $DummyAcquired_{i,t} = \alpha + \beta_1 * ChangeALT_{c,t} * LargeLoss_{i,t} + \beta_2 * ChangeALT_{c,t} * SmallLoss_{i,t} + \beta_3 * LargeLoss_{i,t} + \beta_4 * SmallLoss_{i,t} + \rho * FE_{c,t} + \sigma * FE_j + \epsilon_{i,t}$, where c stands for country, t stands for year, j stands for industry, and i stands for firm. The dependent variable $DummyAcquired_{i,t}$ turns to one in the year of acquisition of a target firm. The $LossLarge_{i,t}$ and $LossSmall_{i,t}$identify whether target firms have large or small losses according to varying criteria: The loss status of targets is estimated as previous year's losses (column (2), previous year's losses scaled by assets (column (3)), and accumulated net losses over the last four years (column (4)). Targets are defined as small-loss (large-loss) firms if their loss proxy in a given year is estimated below (above) the loss proxy's median of all target firms. Column (1) includes country-cohort, year-cohort, and industry-cohort fixed effects. Columns (2)-(4) include country-year-cohort and industry-cohort fixed effects. In Columns (2)-(4), the Change ALT indicator is omitted due to multicollinearity with the fixed effects structure. Standard errors: Clustered at country-year-cohort level. *, **, and *** indicate significance at the 10, 5 and 1% level.

F.3 Additional robustness tests

Table 21: Loss transfer and number of M&A: Robustness to scaling

Outcome	*M&A to active enterprises (log)*					
Sample	*Full Sample*		*Loss Targets*		*Non-Loss Targets*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.3505**		-0.4630***		-0.2366	
	(0.1367)		(0.1628)		(0.2020)	
Tightening ALT		-0.2178		-0.3224		-0.0866
		(0.3337)		(0.3884)		(0.5492)
Loosening ALT		0.4092***		0.5253***		0.3030*
		(0.1319)		(0.1600)		(0.1663)
Observations	1,448	1,448	734	734	714	714
Adjusted R-squared	0.9195	0.9195	0.8918	0.8917	0.9013	0.9012
Country-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows stacked difference-in-differences regressions of change in anti-loss trafficking rules on logarithm of the number of M&A scaled by active enterprises. In columns (3)-(4), the sample only includes targets with pre-deal losses, and in columns (5)-(6), the sample excludes targets with pre-deal losses. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level

Table 22: Loss transfer and number of M&A, enlarged sample & exact treatment thresholds

Outcome	*Volume of M&A Deals (log)*					
Sample	*Full Sample*		*Loss Targets*		*Non-Loss Targets*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.2071**		-0.3265***		-0.0870	
	(0.0801)		(0.0884)		(0.0990)	
Tightening ALT		-0.2454		-0.3804		-0.0850
		(0.2093)		(0.2462)		(0.3077)
Loosening ALT		0.1902***		0.3026***		0.0880
		(0.0700)		(0.0703)		(0.0649)
Observations	1,448	1,448	714	714	734	734
Adjusted R-squared	0.9617	0.9616	0.9432	0.9431	0.9666	0.9666
Country-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	

Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on logarithm of number of M&A. The sample includes all M&A transactions with a change in shareholding equal to or exceeding the threshold defined in the treatment country's anti loss trafficking regulation. In columns (3)-(4), the sample only includes targets with pre-deal losses and in columns (5)-(6), the sample excludes targets with pre-deal losses. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. Specification: $M\&A_{ctl} = \alpha + \beta_j * ChangeALT_{ct} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl}$, where c stands for country, l for target type, and t for year. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level.

Table 23: Loss transfer and number of M&A, controlling for GAAR

Outcome	*Volume of M&A Deals (log)*					
Sample	*Full Sample*		*Loss Targets*		*Non-Loss Targets*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.1875**		-0.3051***		-0.0698	
	(0.0737)		(0.0657)		(0.0924)	
Tightening ALT		-0.1945		-0.3199*		-0.0481
		(0.1722)		(0.1901)		(0.2852)
Loosening ALT		0.1846**		0.2989***		0.0789
		(0.0770)		(0.0586)		(0.0655)
GAAR	-0.0883*	-0.0878*	-0.1024*	-0.1015*	-0.0697	-0.0712
	(0.0466)	(0.0462)	(0.0550)	(0.0567)	(0.0620)	(0.0606)
Observations	1,448	1,448	714	714	734	734
Adjusted R-squared	0.9619	0.9619	0.9425	0.9424	0.9688	0.9688
Country-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on the logarithm of the number of M&A controlling for general anti-avoidance regulations (GAAR). In columns (3)-(4), the sample only includes targets with pre-deal losses and in columns (5)-(6), the sample excludes targets with pre-deal losses. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. Specification: $M\&A_{ctl} = \alpha + \beta_j * ChangeALT_{ct} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl}$, where c stands for country, l for target type, and t for year. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level.

Table 24: Loss transfer and young firm entry (unscaled)

Outcome	*Firm Births (log)*			
	(1)	(2)	(3)	(4)
Change ALT	-0.0810***		-0.0340	
	(0.0257)		(0.0236)	
Tightening ALT		0.0987**		0.0752*
		-0.0433		(0.0433)
Loosening ALT		0.1260***		0.0645**
		(0.0290)		(0.0272)
Observations	26,156	26,156	26,156	26,156
Adjusted R-squared	0.9808	0.9808	0.9812	0.9812
Country-Industry-Cohort FE	Yes	Yes	Yes	Yes
Industry-Year-Cohort FE	Yes	Yes	Yes	Yes
Country Controls	No	No	Yes	Yes

Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on firm births. Firm births is the logged number of births. Specification: $Outcome_{ict} = \alpha + \beta_1 * ChangeALT_{ct} + \rho * Controls_{ict} + \sigma * FE_{ic} + \delta * FE_{iT} + \epsilon_{ict}$, where i stands for industry, c for country and t for year. The analysis is conducted at country-industry level. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-industry-cohort level.

F.4 Robustness checks on the main analysis

F.4.1 Main results entropy balanced

Table 25: Loss transfer and number of M&A, entropy balanced

Outcome	*Number of M&A (log)*					
Sample	*Full sample*		*Loss targets*		*Non-loss targets*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.1666***		-0.2827***		-0.0467	
	(0.0543)		(0.0597)		(0.0599)	
Tightening ALT		-0.2961*		-0.4100***		-0.1595
		(0.1582)		(0.1500)		(0.1766)
Loosening ALT		0.1206**		0.2374***		0.0066
		(0.0590)		(0.0613)		(0.0717)
Observations	1,434	1,434	707	707	727	727
Adjusted R-squared	0.6223	0.6221	0.9623	0.9624	0.9729	0.9729
Country-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked and entropy-balanced difference-in-differences regressions of change in anti-loss trafficking rules on logarithm of number of M&A. In columns (3)-(4), the sample only includes targets with pre-deal losses and in columns (5)-(6), the sample excludes targets with pre-deal losses. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. Specification: $M\&A_{ctl} = \alpha + \beta_j * ChangeALT_{ct} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl}$, where c stands for country, l for target type, and t for year. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level.

Table 26: Triple-DiD loss transfer and number of M&A, entropy balanced

Outcome	*Volume of M&A Deals (log)*			
	(1)	(2)	(3)	(4)
Change ALT	-0.0467			
	(0.0600)			
Change ALT × Loss	-0.2360***		-0.2153***	
	(0.0488)		(0.0466)	
Tightening ALT		-0.1595		
		(0.1768)		
Tightening ALT × Loss		-0.2505**		-0.2585**
		(0.1136)		(0.1114)
Loosening ALT		0.0066		
		(0.0717)		
Loosening ALT × Loss		0.2309***		0.1999***
		(0.0555)		(0.0551)
Observations	1,434	1,434	1,414	1,414
Adjusted R-squared	0.9754	0.9754	0.9778	0.9778
Country-Loss-Cohort FE	Yes	Yes	-	-
Year-Loss-Cohort FE	Yes	Yes	-	-
Year-Country-Cohort FE	-	-	Yes	Yes
Loss * Country controls	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked and entropy-balanced triple difference-in-differences regressions of change in anti-loss trafficking rules on logarithm of number of M&A. All right-hand side variables are interacted with the dummy *loss* indicating whether or not a target reports losses prior to the deal. In columns (1)-(2), we rerun the main specification with the interactions. In columns (3)-(4), we add country-year fixed effects. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. Specification (1)-(2): $M\&A_{ctl} = \alpha + \beta_a * ChangeALT_{ct} + \beta_b * ChangeALT_{ct} * loss_l + \rho * Controls_{ct} + \zeta * Controls_{ct} * loss_l + \sigma * FE_{cl} + \delta * FE_{tl} + \epsilon_{ctl}$, and (3)-(4): $M\&A_{ctl} = \alpha + \beta_b * ChangeALT_{ct} * loss_l + \rho * Controls_{ct} * loss_l + \sigma * FE_{cl} + \delta * FE_{tl} + \gamma * FE_{ct} + \epsilon_{ctl}$, where c stands for country, l stands for target type (loss or non-loss), and t for year. Non-interacted terms are only omitted due to collinearity with fixed effects. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level.

Table 27: Loss transfer and young firm exit and entry, entropy balanced

Outcome	*Survival rate*		*Birth rate*	
	(1)	(2)	(3)	(4)
Change ALT	-0.0255***		-0.00422***	
	(0.00311)		(0.00127)	
Tightening ALT		-0.0497***		0.0162***
		(0.00846)		(0.00296)
Loosening ALT		0.0205***		0.00884***
		(0.00336)		(0.00140)
Observations	24,615	24,615	24,684	24,684
Adjusted R-squared	0.763	0.763	0.815	0.817
Country-Industry-Cohort FE	Yes	Yes	Yes	Yes
Industry-Year-Cohort FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked and entropy-balanced difference-in-differences regressions of change in anti-loss trafficking rules on survival rate (columns (1)-(2)) and birth rate (columns (3)-(4)). Survival rate is the rate of survival of four year old entrants. Birth rate is the number of births as a percentage of the population of active enterprise. Specification: $Outcome_{ict} = \alpha + \beta_1 * ChangeALT_{ct} + \rho * Controls_{ict} + \sigma * FE_{ic} + \delta * FE_{iT} + \epsilon_{ict}$, where i stands for industry, c for country and t for year. The analysis is conducted at country-industry level. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-industry-cohort level.

Table 28: Loss transfer and industry performance, entropy balanced

Outcome	*Industry Productivity*					
Sample	*Full Sample*		*High R&D*		*Low R&D*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.0042***		-0.0085**		-0.0046***	
	(0.001)		(0.004)		(0.001)	
Tightening ALT		-0.0106***		-0.0272**		-0.0104***
		(0.004)		(0.013)		(0.004)
Loosening ALT		0.0032**		0.0055		0.0036**
		(0.001)		(0.004)		(0.002)
Observations	47,432	47,432	6,276	6,276	38,513	38,513
Adjusted R-squared	0.813	0.813	0.855	0.856	0.807	0.807
Year-Industry-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Industry-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Triple DiD: within-country-year difference in coeff. low vs. high risk				*Change ALT*	*Tightening*	*Loosening*
				-0.0050*	-0.0174*	0.0029

Notes: The table shows the results for the stacked and entropy-balanced difference-in-differences regressions of change in anti-loss trafficking rules on industry *productivity*. Panel A shows specifications without controls. Panel B shows specifications excluding industry controls, keeping country controls. The regression is also split between high (columns (3)-(4)) and low R&D intensive industries (columns (5)-(6)) classified based on NACE2 codes. Industry productivity is the sales-weighted average ROA across all firms in a country-industry cluster. Specification: $Outcome_{ict} = \alpha + \beta_1 * ChangeALT_{ct} + \rho * Controls_{ict} + \sigma * FE_{ic} + \delta * FE_{it} + \epsilon_{ict}$, where i stands for industry, c for country and t for year. In the bottom rows, we report coefficients from the triple-interacted DiD (following the specification in main table 12) testing for difference between the coefficients on Change, Tightening, and Loosening ALT across the High vs. Low R&D intensity groups. All variables are defined in Appendix A. The analysis is conducted at country-industry level. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-industry-cohort level.

F.4.2 Main result without controls

Table 29: Loss transfer and number of M&A, no controls

Outcome	*Number of M&A (log)*					
Sample	*Full sample*		*Loss targets*		*Non-loss targets*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.1037		-0.1762***		-0.0332	
	(0.0672)		(0.0630)		(0.0726)	
Tightening ALT		-0.0037		-0.1236		0.0331
		(0.1711)		(0.1592)		(0.1759)
Loosening ALT		0.1531***		0.2021***		0.0660
		(0.0449)		(0.0490)		(0.0602)
Observations	1,434	1,434	707	707	727	727
Adjusted R-squared	0.6231	0.6229	0.9596	0.9596	0.9686	0.9686
Country-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked and entropy-balanced difference-in-differences regressions of change in anti-loss trafficking rules on logarithm of number of M&A without controls. In columns (3)-(4), the sample only includes targets with pre-deal losses and in columns (5)-(6), the sample excludes targets with pre-deal losses. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. Specification: $M\&A_{ctl} = \alpha + \beta_j * ChangeALT_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl}$, where c stands for country, l for target type, and t for year. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level.

Table 30: Loss transfer and number of M&A interacted, no controls

Outcome	*Volume of M&A Deals (log)*			
	(1)	(2)	(3)	(4)
Change ALT	-0.0332			
	(0.0726)			
Change ALT × Loss	-0.1429***		-0.1289***	
	(0.0421)		(0.0391)	
Tightening ALT		0.0331		
		(0.1760)		
Tightening ALT × Loss		-0.1567**		-0.1517**
		(0.0686)		(0.0669)
Loosening ALT		0.0660		
		(0.0603)		
Loosening ALT × Loss		0.1361**		0.1176**
		(0.0530)		(0.0477)
Observations	1,434	1,434	1,414	1,414
Adjusted R-squared	0.9727	0.9727	0.9759	0.9759
Country-Loss-Cohort FE	Yes	Yes	-	-
Year-Loss-Cohort FE	Yes	Yes	-	-
Year-Country-Cohort FE	-	-	Yes	Yes

Notes: The table shows the results for the stacked triple difference-in-differences regressions of change in anti-loss trafficking rules on logarithm of number of M&A without controls. All right-hand side variables are interacted with the dummy *loss* indicating whether or not a target reports losses prior to the deal. In columns (1)-(2), we rerun the main specification with the interactions. In columns (3)-(4), we add country-year fixed effects. The analysis is conducted at the country-target type (loss or non-loss) level. All variables are defined in Appendix A. Specification (1)-(2): $M\&A_{ctl} = \alpha + \beta_a * ChangeALT_{ct} + \beta_b * ChangeALT_{ct} * loss_l + \rho * Controls_{ct} + \zeta * Controls_{ct} * loss_l + \sigma * FE_{cl} + \delta * FE_{tl} + \epsilon_{ctl}$, and (3)-(4): $M\&A_{ctl} = \alpha + \beta_b * ChangeALT_{ct} * loss_l + \sigma * FE_{cl} + \delta * FE_{tl} + \gamma * FE_{ct} + \epsilon_{ctl}$, where c stands for country, l stands for target type (loss or non-loss), and t for year. Non-interacted terms are only omitted due to collinearity with fixed effects. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-cohort level.

Table 31: Loss transfer and young firm entry and exit, no controls

Outcome	*Survival rate*		*Birth rate*	
	(1)	(2)	(3)	(4)
Change ALT	-0.0211***		-0.0086***	
	(0.00424)		(0.0027)	
Tightening ALT		-0.0127		0.0262***
		(0.00885)		(0.00493)
Loosening ALT		0.0228***		0.0173***
		(0.00477)		(0.00266)
Observations	24,907	24,907	24,966	24,966
Adjusted R-squared	0.593	0.593	0.7002	0.702
Country-Industry-Cohort FE	Yes	Yes	Yes	Yes
Industry-Year-Cohort FE	Yes	Yes	Yes	Yes

Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on survival rate (columns (1)-(2)) and birth rate (columns (3)-(4)) without control variables. Survival rate is the rate of survival of four-year-old entrants. Birth rate is the number of births as a percentage of the population of active enterprises. Specification: $Outcome_{ict} = \alpha + \beta_1 * ChangeALT_{ct} + \sigma * FE_{ic} + \delta * FE_{iT} + \epsilon_{ict}$, where i stands for industry, c for country and t for year. The analysis is conducted at country-industry level. All variables are defined in Appendix A. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-industry-cohort level.

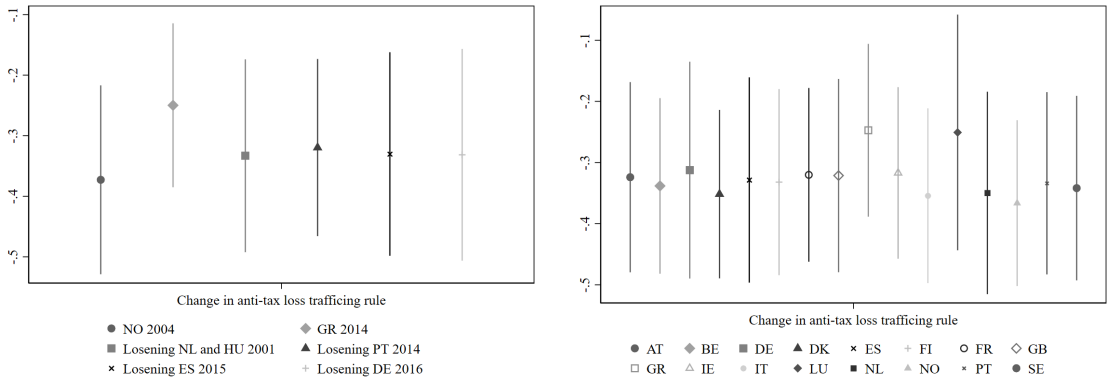
Table 32: Loss transfer and industry performance, no controls

Panel A: Specification without control variables						
Outcome	*Industry Productivity*					
Sample	*Full Sample*		*High R&D*		*Low R&D*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.0011		-0.0127**		0.0014	
	(0.002)		(0.005)		(0.002)	
Tightening ALT		0.0188***		0.0120		0.0220***
		(0.004)		(0.012)		(0.004)
Loosening ALT		0.0096***		0.0191***		0.0080***
		(0.002)		(0.005)		(0.002)
Observations	51,222	51,222	6,762	6,762	41,522	41,522
Adjusted R-squared	0.695	0.695	0.746	0.747	0.684	0.685
Year-Industry-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Industry-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Specification without industry-control variables						
Outcome	*Industry Productivity*					
Sample	*Full Sample*		*High R&D*		*Low R&D*	
	(1)	(2)	(3)	(4)	(5)	(6)
Change ALT	-0.0097***		-0.0211***		-0.0084***	
	(0.002)		(0.005)		(0.002)	
Tightening ALT		-0.0172***		-0.0387***		-0.0169***
		(0.004)		(0.012)		(0.004)
Loosening ALT		0.0088***		0.0185***		0.0073***
		(0.002)		(0.005)		(0.002)
Observations	51,222	51,222	6,762	6,762	41,522	41,522
Adjusted R-squared	0.717	0.717	0.770	0.770	0.710	0.710
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Industry-Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Triple DiD: within-country-year diff. in coeff. low vs. high risk, no controls				*Change ALT*	*Tightening*	*Loosening*
				-0.0116**	-0.0074	0.0128***
Triple DiD: within-country-year diff. in coeff. low vs. high risk, country controls				*Change ALT*	*Tightening*	*Loosening*
				-0.0132***	-0.0236**	0.0118**

Notes: The table shows the results for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on industry *productivity*. Panel A shows specifications without controls. Panel B shows specifications excluding industry controls, keeping country controls. The regression is also split between high (columns (3)-(4)) and low R&D intensive industries (columns (5)-(6)) classified based on NACE2 codes. Industry productivity is the sales-weighted average ROA across all firms in a country-industry cluster. Specification: $Outcome_{ict} = \alpha + \beta_1 * ChangeALT_{ct} + \rho * Controls_{ict} + \sigma * FE_{ic} + \delta * FE_{it} + \epsilon_{ict}$, where i stands for industry, c for country and t for year. In the bottom rows, we report coefficients from the triple-interacted DiD (following the specification in main table 12) testing for difference between the coefficients on Change, Tightening, and Loosening ALT across the High vs. Low R&D intensity groups. All variables are defined in Appendix A. The analysis is conducted at country-industry level. *, **, and *** indicate significance at the 10, 5 and 1% level. Standard errors: Clustered at country-industry-cohort level.

F.4.3 Main results dropping a country/cohort at a time

Figure 10: Change in loss target M&A at country-level, robustness to sample selection

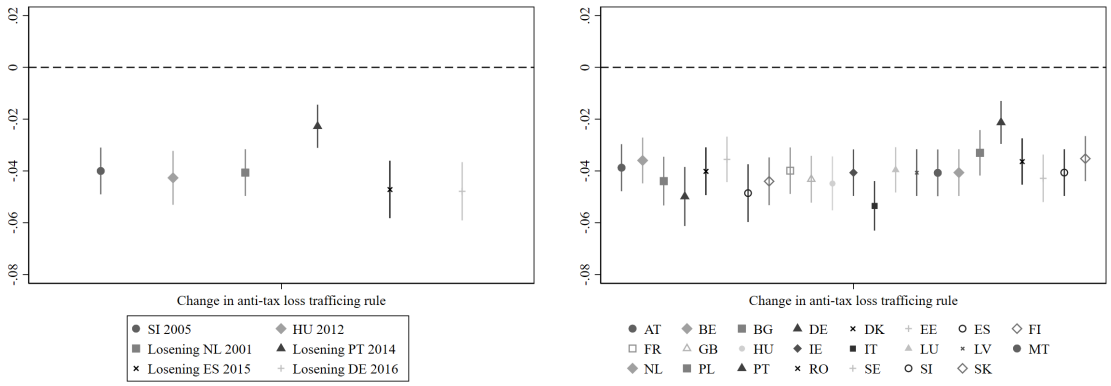


(a) Dropping a cohort at a time

(b) Dropping a country at a time

Notes: The figure plots the coefficients of $ChangeALT_{ct}$ and 95 percent confidence intervals (the vertical lines) based on cluster robust standard errors for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on logarithm of number of M&A in loss targets (Table 5, Column 3), where each plotted coefficient results from dropping one cohort at a time, (a), or dropping one country at a time, (b). Specification: $M\&A_{ctl} = \alpha + \beta_j * ChangeALT_{ct} + \rho * Controls_{ct} + \sigma * FE_c + \delta * FE_t + \epsilon_{ctl}$, where c stands for country, l for target type, and t for year. Standard errors: Clustered at country-cohort level.

Figure 11: Change in survival at industry-level, robustness to sample selection

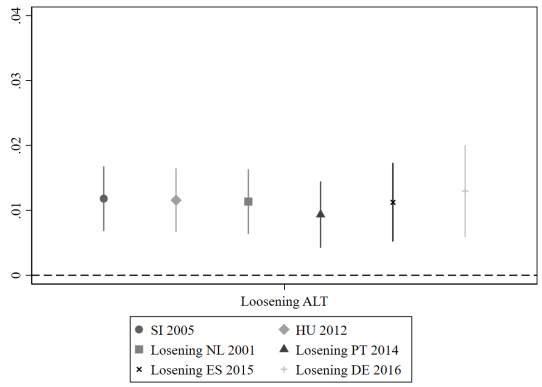


(a) Dropping a cohort at a time

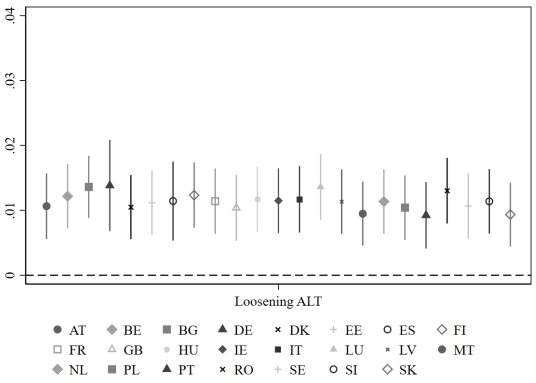
(b) Dropping a country at a time

Notes: The figure plots the coefficients of $ChangeALT_{ct}$ and 95 percent confidence intervals (the vertical lines) based on cluster robust standard errors for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on the survival rate (Table 10, column (1)), where each plotted coefficient results from dropping one cohort at a time, (a), or dropping one country at a time, (b). Specification: $Outcome_{ict} = \alpha + \beta_1 * ChangeALT_{ct} + \rho * Controls_{ict} + \sigma * FE_{ic} + \delta * FE_{iT} + \epsilon_{ict}$, where i stands for industry, c for country and t for year. The analysis is conducted at country-industry level. All variables are defined in Appendix A. Standard errors: Clustered at country-industry-cohort level.

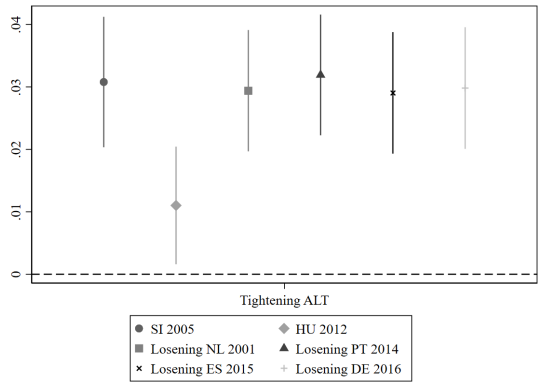
Figure 12: Change in entry rate at industry-level, robustness to sample selection



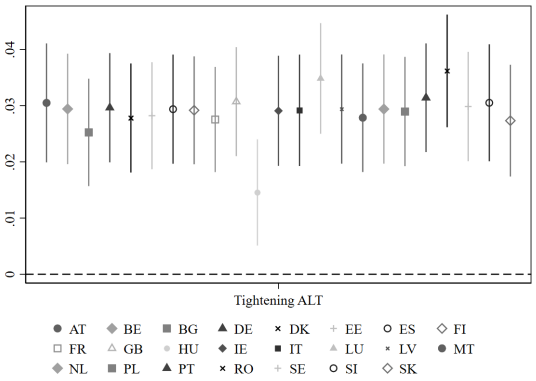
(a) Loosening ALT, dropping a cohort at a time



(b) Loosening ALT, dropping a country at a time



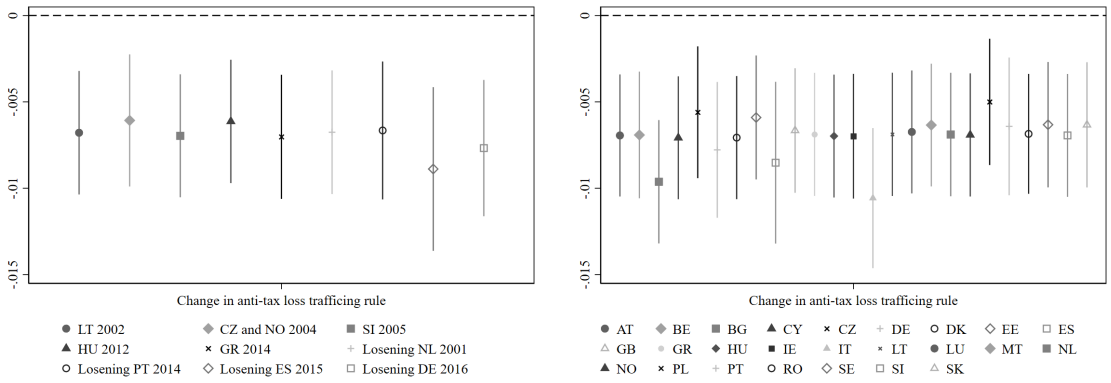
(c) Tightening ALT, dropping a cohort at a time



(d) Tightening ALT, dropping a country at a time

Notes: The figure plots the coefficients of $TighteningALTct$ and $LooseningALTct$ and 95 percent confidence intervals (the vertical lines) based on cluster robust standard errors for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on the birth rate (Table 10, column (4)), where each plotted coefficient results from dropping one cohort at a time, (a), (c), or dropping one country at a time, (b), (d). Specification: $Outcome_{ict} = \alpha + \beta_1 * ChangeALT_{ct} + \rho * Controls_{ct} + \sigma * FE_{ic} + \delta * FE_{iT} + \epsilon_{ict}$, where i stands for industry, c for country and t for year. The analysis is conducted at country-industry level. All variables are defined in Appendix A. Standard errors: Clustered at country-industry-cohort level.

Figure 13: Change in productivity at industry-level, robustness to sample selection



(a) Dropping a cohort at a time

(b) Dropping a country at a time

Notes: The figure plots the coefficients of $ChangeALT_{ct}$ and 95 percent confidence intervals (the vertical lines) based on cluster robust standard errors for the stacked difference-in-differences regressions of change in anti-loss trafficking rules on industry productivity (Table 11, column (1)), where each plotted coefficient results from dropping one cohort at a time, (a), or dropping one country at a time, (b). Specification: $Outcome_{ict} = \alpha + \beta_1 * ChangeALT_{ct} + \rho * Controls_{ict} + \sigma * FE_{ic} + \delta * FE_{iT} + \epsilon_{ict}$, where i stands for industry, c for country and t for year. The analysis is conducted at country-industry level. All variables are defined in Appendix A. Standard errors: Clustered at country-industry-cohort level.

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